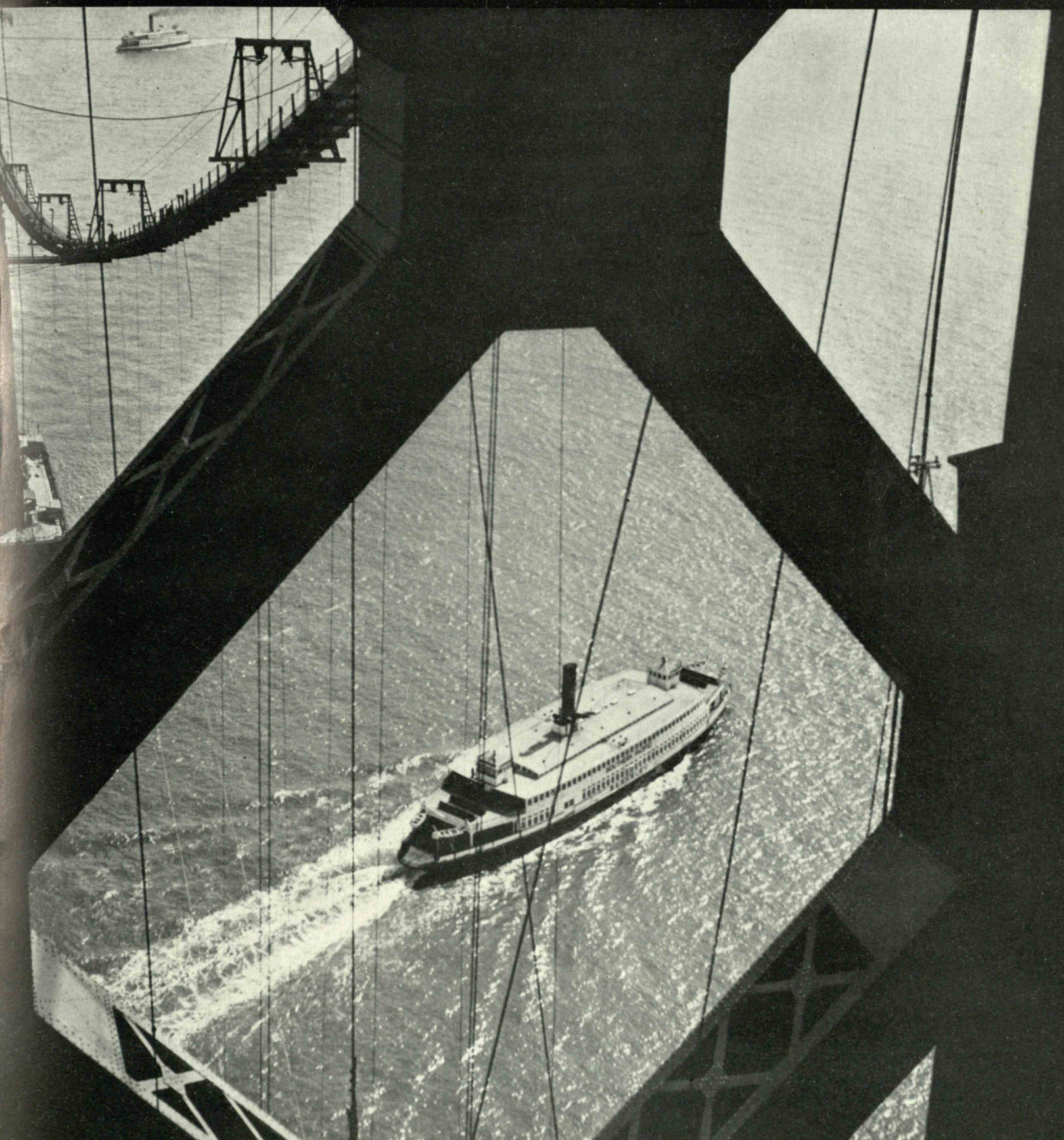


May 1936

TECHNOLOGY

REVIEW

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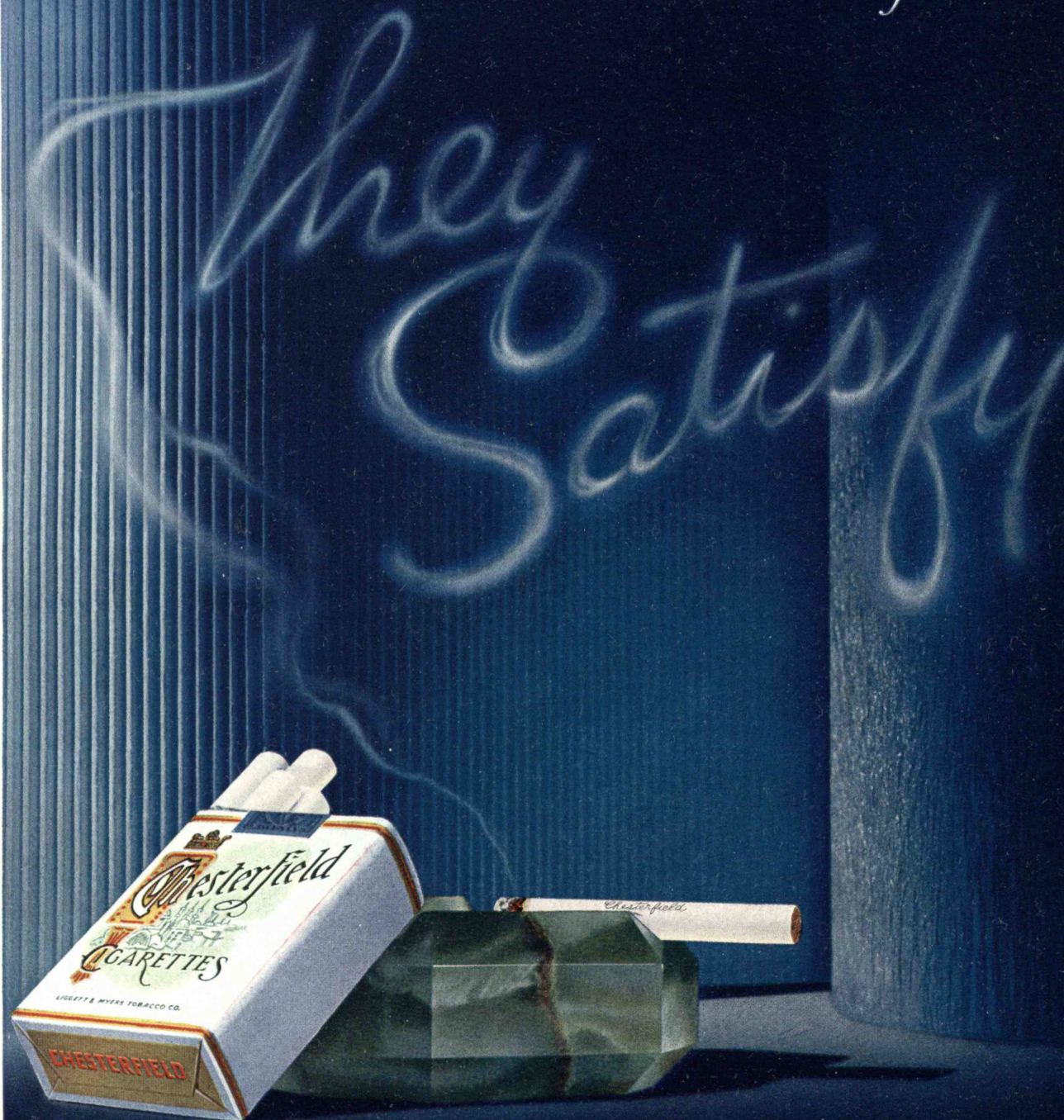


technology review

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THE TABULAR VIEW

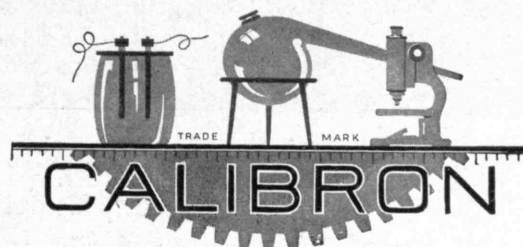
THE author of "Science and the Fine Arts" (page 339), RALPH G. HUDSON, '07, is Professor of Electrical Engineering at the Institute and is in charge of the Course in General Science and General Engineering. He is the author of five books in the technical field and for many years has been chairman of the Committee on Graduation Exercises and Senior Week at Technology. ¶ Professor Hudson, prompted by the conundrums submitted by Review readers and published in the last issue of The Review, has submitted the following problem:

Each dash in the following sentence represents a letter; each group of dashes contains all the letters of the preceding group plus one new letter; the sequence of the letters need not be the same. The problem, of course, is to supply the missing words.

-- DO NOT LIKE -- SAID THE MAN WITH THE BLACK
 ---. THE ---- WE HAVE WITNESSED IS IMPRESSIVE
 BUT WHEN YOU ----- A MAN YOU ----- A
 ----- POWER OF INVESTIGATION, THERE IS BOUND
 TO BE A ----- AGAINST ----- WHEN
 THE ----- OF THIS IS REALIZED. IF THE
 PRACTICE SHOULD PROVE TO BE AN -----
 OTHER ----- MIGHT FOLLOW.

SINCE leaving M.I.T. in 1925 MALCOLM G. DAVIS has been engaged in various types of work in the utility industry. Several years of this period were spent in California, first with one of the large electric utility systems and later as a member of the technical staff of the California Railroad Commission. Subsequently he has been engaged in rate work in the East as director of rates for one of the larger utility systems. As a member of the firm, Public Utility Consultants, in Pittsburgh, he has devoted a portion of his time to general consulting work in the field of public utility economics, rates, and sales development. ¶ PHILIP M. MORSE, who reviews Mr. Gray's book in the Trend of Affairs section, is Associate Professor in the Department of Physics at M.I.T. Last month he contributed the article on metallurgy entitled, "Wolf's Clothing," and in the February issue, a paper on the neutron. ¶ Other contributors to the Trend of Affairs section include FREDERICK G. FASSETT, Jr., Assistant Professor of English at the Institute, and members of The Review Staff.

AS the fourth member of the Cover Club we present WILLIAM E. DAVIDSON, graduate in civil engineering from Rensselaer in 1934, now working as timekeeper for the American Bridge Company on the San Francisco-Oakland Bay Bridge. The photograph on the cover of this issue was taken from a catwalk looking down through the X bracing of one of the bridge towers. In the water, far below, may be seen the ferries which operate in the Bay. ¶ Several readers have requested reprints of the reading list in the March Review. Unfortunately it was not reprinted, but if there is sufficient interest, future lists will be reprinted.



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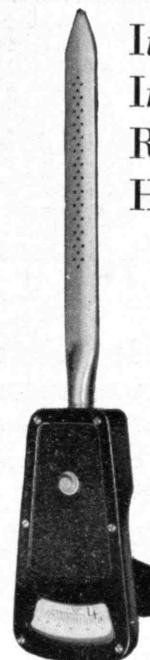
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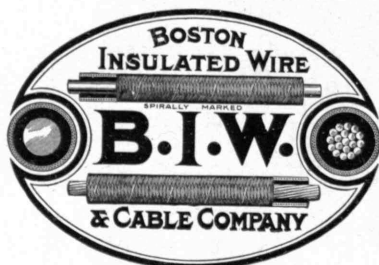
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MAIL RETURNS

Unity

From R. E. DIMOCK, '04:

Recently my wife read in The Review "Soliloquy in a Laboratory," and remarked, "What a fine bit of poetry to be published in a magazine devoted to science." The reply was: "Would you expect The Review to publish anything other than fine material?"

"But," she said, "this is an unusual bit of poetry."

"And," I replied, "The Review is an unusual magazine."

Answered — "I agree it must be so."

For once The Review created harmonious unity.

Sydney, Nova Scotia

Unbelievable Odds

From H. B. RICHMOND, '14:

I assume that the large number of names that have been associated with the development of photographs by telephone, a subject covered admirably in the April issue of The Technology Review, prevented you from making any direct reference to any particular person. I think, however, that somewhere appropriate mention should be made of Austin G. Cooley, '24 (see page five of the March, 1936, issue of *Electronics*).

The reason for mentioning Cooley is that he worked against almost unbelievable odds and did not have placed at his disposal the elaborate facilities of Bell Laboratories. This latest development of low-cost wire transmission by the New York *Times* subsidiary is the work of Cooley.

Cambridge, Mass.

Nature of the Capitalist Crisis

A reader of The Review, inspired by Dr. Dewey's article, "No Economist Can Be Indifferent," in the March issue, writes: "I have been trying for some time to get arguments against [John] Strachey, but have had small success, and am writing in hope that you know of a few good pieces that specifically refute the arguments that he puts forth."

The Review referred this request to B. A. Thresher, Assistant Professor in the Institute's Department of Economics and Social Science, and he writes:

I do not know of any refutation which is directed specifically at Strachey's "The Nature of the Capitalist Crisis." I think, however, that the relevant material might be roughly divided into three parts:

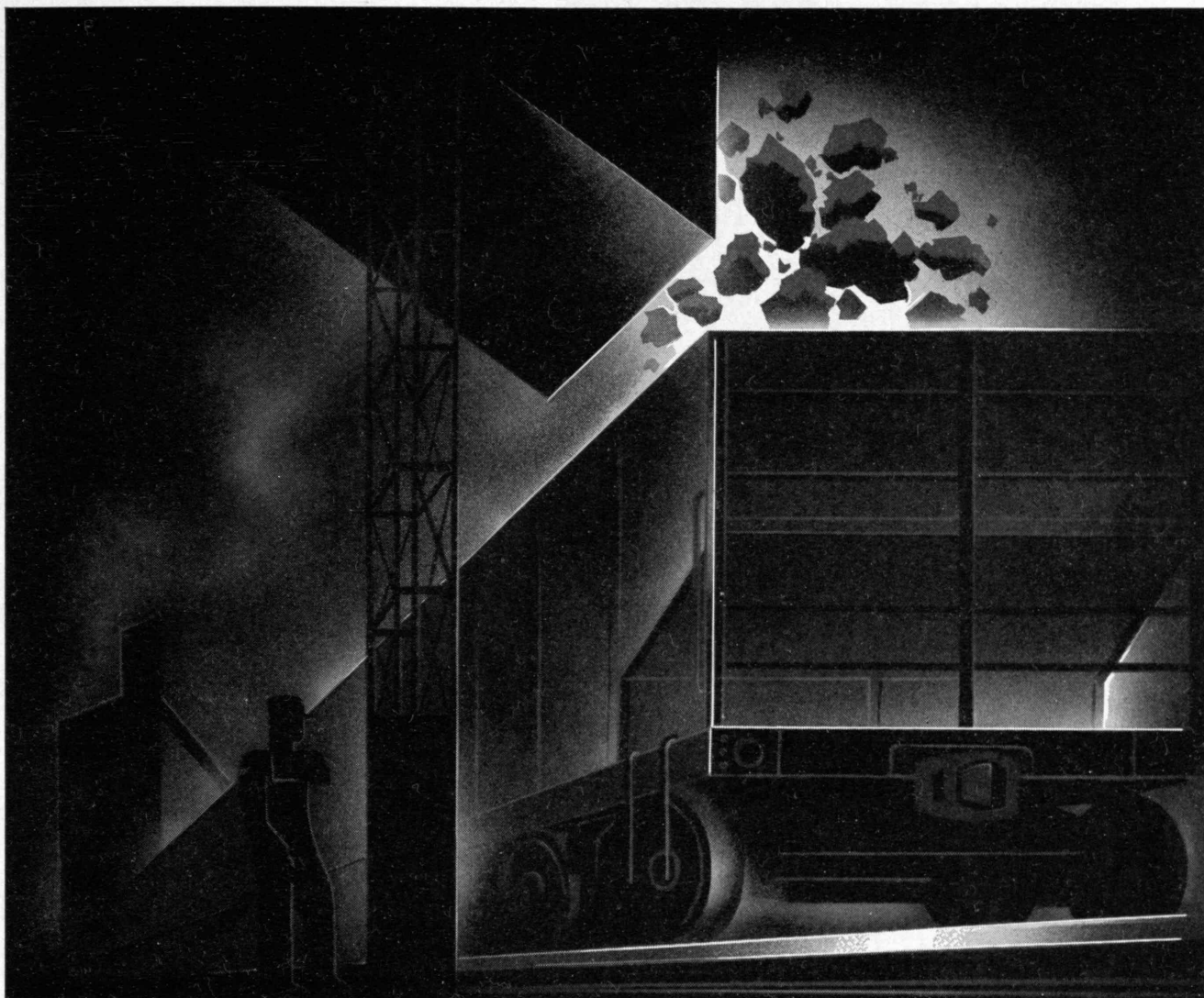
(1) General criticism of the whole Marxian position, for which I think M. M. Bober's "Karl Marx's Interpretation of History" is very useful, as well as Harold J. Laski's book on "Communism."

(2) The Marxian theory of commercial crises, which is Strachey's particular concern. This of course opens up the entire huge area of business cycle theory, to which the best introduction on a scientific plane remains Wesley C. Mitchell's "Business Cycles: The Problem and Its Setting."

(3) The large literature on the feasibility and desirability of economic planning, which of course is implied in any kind of communist program. Here again the range is enormous, but I might mention three books of which I wrote a brief comparative review which appeared in *Mechanical Engineering* for February, 1936. These are Harold Loeb's "The Chart of Plenty"; Barbara Wootton's "Plan, or No Plan"; and Walter Lippmann's "The Method of Freedom." These three books are not all equally valuable, but I selected them for joint review because I think they illustrate very nicely the contrasting points of view from which the subject may be approached.

Miscellaneous

On page 284 of its April issue, The Review published a picture of Technology's champion 1887 tug-of-war team and asked if anyone could identify the stalwarts. Responses, prompt and in complete agreement, were received from several readers including George C. Wales, '89, the noted artist, and R. G. Luther of the What Cheer Mutual Fire Insurance Company and Hope Mutual Fire Insurance Company.



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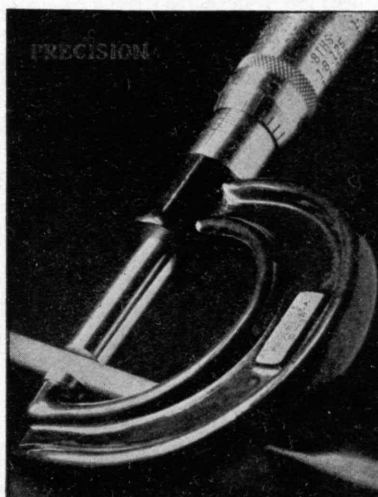
With increased production this plant is operating at 53% less belting cost since installing Goodyear Belts under the G.T.M. Plant Analysis Plan

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Lewis P. Tabor, '22

THE TECHNOLOGY REVIEW

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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 38, NO. 8

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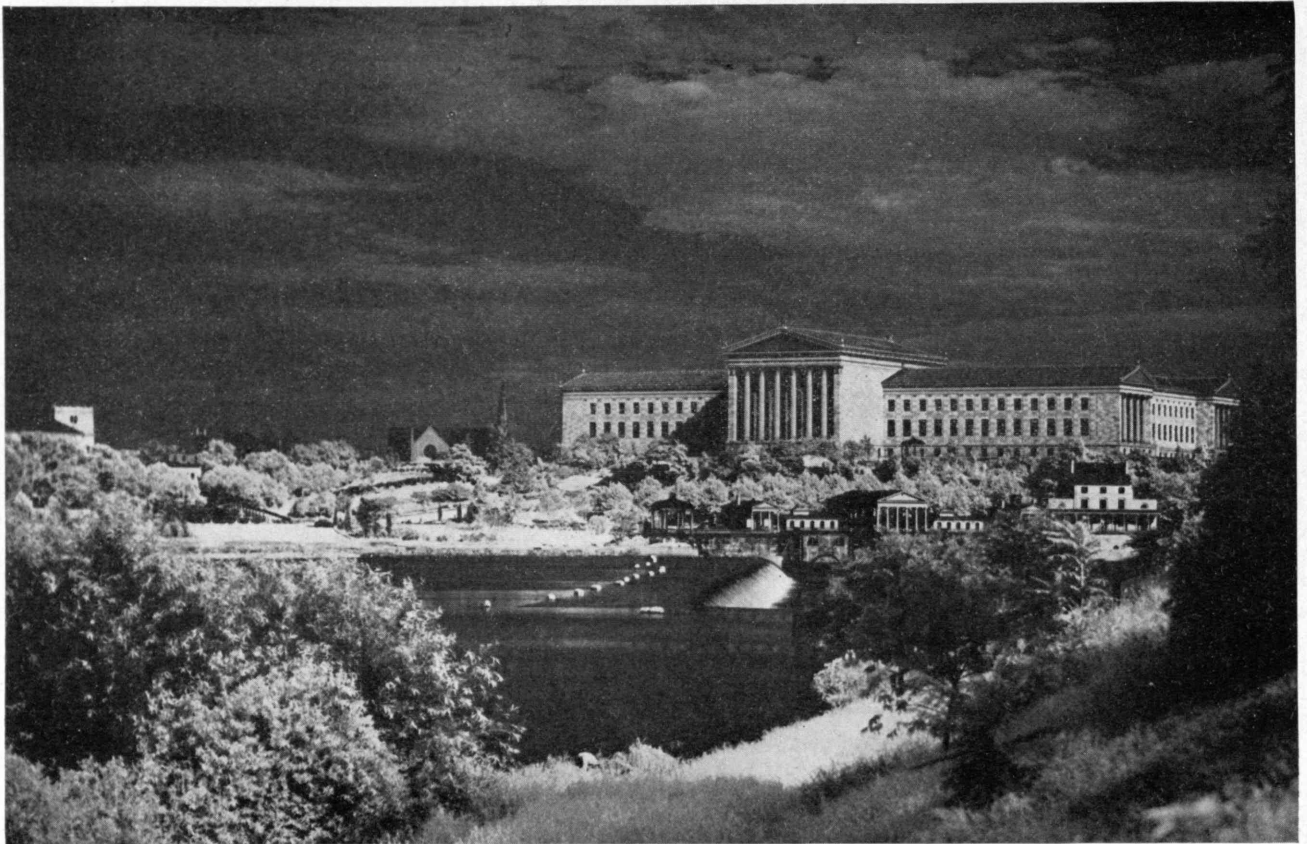
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Infrared

In the foreground, the Schuylkill River; beyond, Philadelphia's great Art Museum. The eerie quality of the picture is the result of exposing with infrared light which the eye never sees. From a photograph by Lewis P. Tabor, '22

THE TECHNOLOGY REVIEW

Vol. 38, No. 8



May, 1936

The Trend of Affairs

Specks of Dust

WHEN a particle of soil from a Kansan wheat field whirls into the air on the wings of a dust storm it joins a motley host of microscopic fragments, a world fellowship of dust that fills the atmosphere and roves with the winds for thousands of miles. Dust specks know no class distinction, for theirs is a community which draws its incalculable multitude from the earth and from interplanetary space in the timeless process of comminution. As civilization advances and the industry of man adds new forms or hastens the natural process of attrition, the world of dust becomes a problem of great scientific concern to which more attention is now being devoted than ever before.

A great deal of the dust of the atmosphere is composed of the earth's soil and vast quantities of particles from the smoke of cities. It is estimated that London alone gives up 7,000,000 tons of smoke a day, thus releasing at least 400 tons of soot particles, a somber legion of fragments that reduces London's share of summer daylight by one sixth. A study by the United States Public Health Service of the effects of smoke in reducing light in New York in January, 1927, showed an average loss of daylight on sunny days of approximately 42% at eight o'clock in the morning. The loss at the same hour in June was approximately 33%, while at noon it was but six per cent. Therefore, smoke abatement, one of the goals of public health engineers for many years, is of paramount importance.

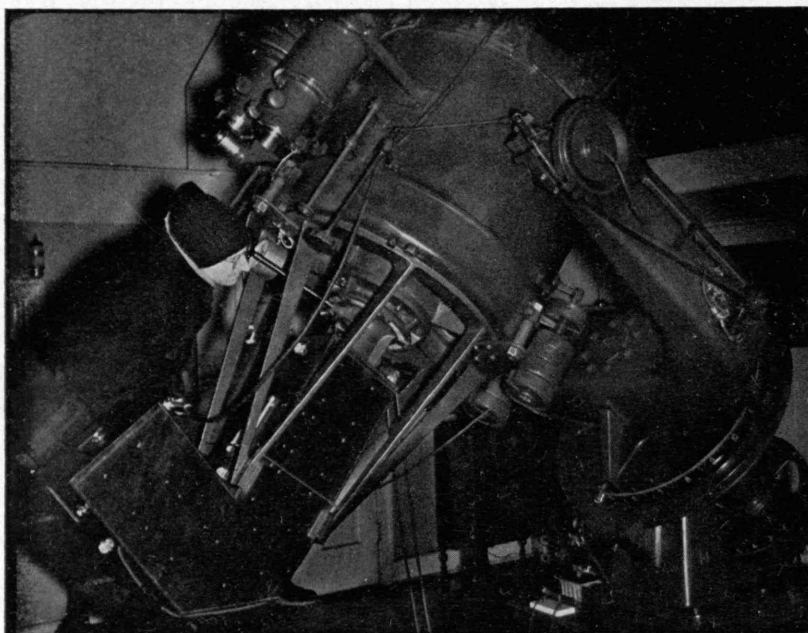
That the number of dust particles in the air varies greatly is indicated by observations at various locations and levels. For example, a cubic foot of air on a New York street has been found to contain 118,000 particles, while at the tenth floor of the Woolworth Building a count of only 72,000 was obtained; at the 58th story the

count dropped to 23,000 particles. The inquisitive nose that ventures into an iron grinding room, however, encounters from 14,800,000 to 48,700,000 dust particles per cubic foot. A New York subway platform has given counts ranging from 1,130,000 to 2,320,000 particles, while a cubic foot of business-office air may contain from 128,000 to 172,000 dust motes.

Analysis of a dust cloth in a New England household might at various times of the year show a strange company of tiny particles. It would not be surprising to find a few lonely specks whipped from a Texan garden by a dust storm, smoke particles from a forest fire in northern Canada, volcanic dust from a Pacific island, industrial fragments from factories for miles around, salt particles snatched from the spindrift of the sea by the east wind, and possibly some star dust. There would likely be representatives from the plant and animal kingdom, including scales, seeds, spores, bacteria, plant cells, algæ, rotifers, microscopic fragments of hair, feathers, tissue, and fibers. The mineral world might have as its representatives silica, aluminum silicate, calcium carbonate, calcium phosphate, magnesia, iron oxide, sodium chloride, and many others.

Dust apparently exists at great heights above the earth's surface, for samples of air collected by the Institute's meteorological observation airplane at an altitude of 20,000 feet held many interesting specimens. This study of the distribution of dust and bacteria in the atmosphere is continuing under the direction of Professor Bernard E. Proctor, '23, of the Department of Biology and Public Health. Some investigators believe the air is sterile many miles above the earth.

It must not be concluded that all the inhabitants of the world of dust are malevolent. Some dust is highly desirable, for these infinitesimal particles are the nucleuses upon which water vapor condenses to form rain and



Guiding a telescope during the making of a spectrogram on a winter's evening at Gustavus Wynne Cook's Roslyn House Observatory outside Philadelphia

clouds. Through their influence as bearers of raindrops and fog particles, dust specks control humidity and temperature to a remarkable degree. So thank the dust when clouds form and mask the face of the burning sun on an August day.

To the casual observer dust is just dust, but to the scientist there are any number of dust classifications, some of which raise humble specks to positions of great importance. For the sake of simplicity let us consider atmospheric dust as the common variety that mars the polish of the piano. Under ordinary conditions this dust group is simply a household nuisance, perhaps a bit irritating to the nose and eyes, though not particularly dangerous. Add a few particles from the dried sputum of a person suffering from a communicable disease and the potentialities are quite different. The dust then becomes host to germs and if enough of the right kinds are present, there is danger of contagion.

Medical research in recent years indicates that atmospheric dust under ordinary conditions is not so dangerous to health as was once believed. Dr. Samuel C. Prescott, '94, and Dr. Murray P. Horwood, '16, in their recent revised edition of "Sedgwick's Principles of Sanitary Science and Public Health" recall that at one time the danger of atmospheric infection was considered so great that the air of operating rooms in hospitals was disinfected with carbolic sprays. The practice has been abandoned in favor of aseptic surgery, because the danger of infection from the atmosphere is considered remote. Nevertheless, the air of operating rooms is frequently washed today to remove most of the dust particles and bacteria present. In consequence of the newer and sounder knowledge of the significant sources and modes of infection, the old and terrifying pesthouse, which once stood in gloomy isolation on the outskirts of almost every community, has been replaced by the modern hospital for communicable diseases. Often it may be found in the very heart of a congested district.

Concerned as it is with the effects of all dust, science, particularly in the fields of public health and medicine, is interested in the many complex dust forms produced in industrial processes, which include products of combustion and chemical processes, as well as mechanical operations in which abrasion occurs. Dust is one of the most widespread and dangerous occupational hazards to which much attention has been given in recent years. It was in 1914 that the United States Public Health Service, working in cooperation with the Bureau of Mines, began a study of workers subjected to dust in the lead and zinc mines of Missouri. Later studies were made in a cement mill, a granite cutting plant, a cotton textile mill, a municipal street sweeping department, slate, granite, marble, and talc quarries, as well as a silverware manufacturing plant, anthracite mines, and sand-blasting operations. The studies showed that workers in certain of

these fields were subject to various diseases, including tuberculosis, silicosis, anthracosis, and pneumoconiosis; but the workers in the silverware plant and the municipal street sweeping department showed no marked tendency to respiratory diseases.

In all these studies investigators were constantly concerned with the quantity of free silica present in the various forms of dust. In "Preventive Medicine and Hygiene," Dr. Milton J. Rosenau, former director of the School of Public Health of Harvard University and Technology, says that from the evidence gathered on the injurious effects produced by inhaling dust it is apparent that knowledge of the properties of a given dust is essential. "Numerous investigations of the industrial dust problem," he adds, "indicate that these properties are the chemical and mineralogical composition of the dust, its concentrations, and its particle size." The latter consideration, Dr. Rosenau finds, is of great importance, for the examination of silicotic lungs has revealed that virtually all the dust particles are less than 10 microns in their longest dimension. Apropos of this observation it might be noted that studies have shown that the average size of dust particles in the working atmosphere of many industries is smaller than 10 microns, while larger and heavier particles apparently settle quickly and are not found in large numbers.

Although much progress has been made in overcoming the hazards of dust in industry, a great deal remains to be done. Dr. Rosenau finds that there are many industrial dusts about which little or nothing is known. Among these he cites tripoli, a free silica composed of quartz and amorphous silica, vitreous quartz, the dusts of the foundry and ceramic industries, as well as pure talc and soapstone from which it is manufactured. New industries produce new and complex dust forms, recruits to that vast community of floating particles that fill the atmosphere and travel great distances at the will of the winds. The industrial hazards of dust probably

never can be completely eliminated, but eventual control of its injurious effects in many fields may be expected.

Salmon Engineering

GREAT engineering projects often create unforeseen problems wholly unrelated to their main objective: Such is the case at Bonneville. The graceful Chinook salmon who yearn for the upper tributaries of the Columbia River will find that a 72-foot wall has been raised between them and the glacier-cooled waters they seek. Not for humanitarian reasons alone is it necessary to aid these 20- to 30-pound swimmers of currents: If they die without spawning we will be faced with the loss of a \$10,000,000 industry.

After several years of brow wrinkling, the biologists of the Bureau of Fisheries in coöperation with the conservation authorities of Washington and Oregon and the Army engineers have decided on the installation of a stairway and an elevator. At each end of the dam a stream of water moving at the rate of 1,000 cubic feet a second is planned to attract the salmon with his avidity for swiftly moving waters and thus lead him into the collecting system. On the right he will find the stairway: a series of 16-foot pools placed at intervals of one foot — child's play for the salmon to ascend. On the left — "watch your step, please" — the lifts may be found. The elevators, or fish locks, are 20 feet by 30 feet. "Entrance gates 10 feet square will discharge 200 cubic feet of water per second, as an inducement to the fish to enter the locks. Once the fish are inside, the entrance gates will close, and the water will be admitted through the floor of the lock chamber to raise the water level to that of the top of the dam. The 'elevator' itself rises with the mounting water, and when the exit level is reached the gates are opened and the fish speeded on their way by the device of tipping the floor and spilling them out into the river above the dam. Two fish locks will be in operation at the same time; while one lock is ascending, the other will be receiving fish below." Downstream traffic is composed of youngsters only and it is expected that the stairway will be their means of descent. It is possible, however, for the small fish to pass unscathed through the large openings in the power wheels.

For the salmon hatched in the plateaus of eastern Washington, 150 miles from the Canadian border, the entire problem has thus been solved. There are many, however, whose urge is to travel into tributaries now being cut off by Grand Coulee. This 500-foot barrier thwarts all suggestions of circumlocution. Here the biologists plan to build a collecting trap in the river and holding pools in the canyon nearby. Special troughs will be built for artificial hatching of the eggs with pick-up and delivery service maintained to return the youngsters to the stream. An attempt may even be made to remove the fertilized spawn to tributaries which will be accessible to the returning adult salmon.

With so much planning for their welfare it is a relief to know that the salmon will not have to face the difficulties encountered by Darwin's alleged herring. You remember that belief in the relation between functional

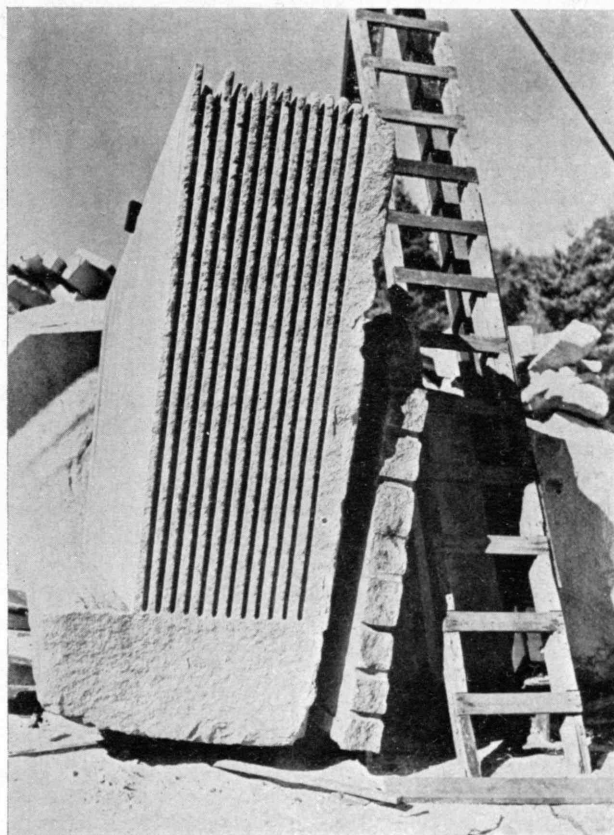
need and organic development led Darwin to teach his fish to live in the air. The herring accompanied him on morning strolls, led with a blue ribbon, until Darwin absent-mindedly crossed a bridge on which the planking was too widely spaced, and the poor little herring, awkwardly following, fell through and was drowned.

Patents by the Century

THE United States Patent Office this year celebrates its centennial, for it was on July 4, 1836, that the American patent system of regular official search was started. In the century of its history, civilization has marched forward with seven-league strides and the milestones of its progress include many of the most important inventions of all time.

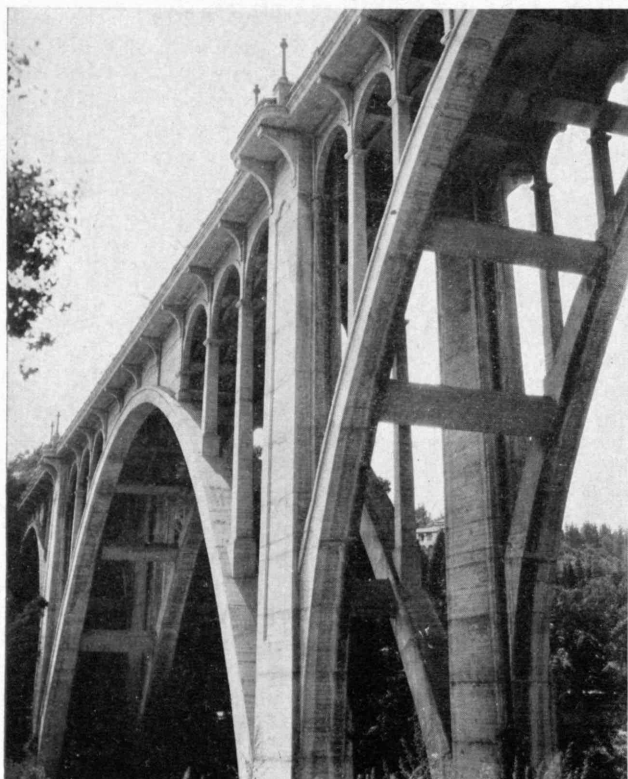
The phosphorus match was invented in the year of the founding of the bureau and next in the list of American inventions came Hiram Moore's harvesting machine and Charles Goodyear's method of vulcanizing rubber, while in Europe Daguerre and Niepce developed their method of photography. The pneumatic tire, the turret lathe, the rotary printing press, and the sewing machine — all American inventions — came in the first decade of our patent system. Then followed the hydraulic turbine and the humble but indispensable safety pin.

In 1851, just 15 years after an act of Congress inaugurated for the first time in history "a methodical examination for novelty in advance of the grant of a patent," Vail invented the electric locomotive. A year later Otis produced an elevator that could be braked,



H. E. Fletcher Co.

By a new method granite can now be thus cut into thin sheets



The leaping concrete arches of the Arroyo Street Bridge, Pasadena, Calif.

and it is recorded that two years later Walter Hunt gained undying fame by giving mankind the paper collar. Steel was invented in 1857, to be followed by the building of the *Monitor* and the invention of the machine gun within five years. The mowing machine, the web press, railway block signals, typewriters, lawn mowers, air brakes, celluloid, telephones, talking machines, Professor Elihu Thompson's method of electric welding, Edison's incandescent light, and Brush's arc light followed.

Trolley cars came in 1884, and four years later George Eastman and the Rev. H. Goodwin invented the transparent photographic film. Then quickly in the succeeding years came such important inventions as the alternating-current motor, Edison's motion-picture machine (which followed Seller's invention by 32 years) the submarine, and the gasoline automobile, radio sending apparatus and the radio telephone in 1902, the motor-driven airplane a year later, and the seaplane in 1911. Radio vacuum tubes were invented in 1907 and the important synthetic resin industry of today had its beginning in L. H. Baekeland's invention of 1909.

During this period European inventors had contributed Portland cement, the gas stove burner, aniline dyes, the electric furnace, dynamite, the Otto gas engine, manganese steel, rayon, the steam turbine, smokeless powder, Lumière's moving-picture projector, low-frequency wireless telegraphy, the Diesel oil motor, photography by wire, nitrogen fixation, and the helicopter.

At first the granting of patents in this country was placed in the hands of the Secretary of State, the Secretary of War, and the Attorney General. When Thomas Jefferson was Secretary of State he personally examined

many petitions for patents; but by the Act of July 4, 1836, the Patent Office was established under a commissioner; and on March 3, 1849, when the Department of the Interior was established, the Patent Office was placed under its jurisdiction. In 1925 it was transferred by President Coolidge to the Department of Commerce.

The first patent granted under the original law was to Samuel Hopkins of Vermont, July 31, 1790, and was for a process for making potash and pearlsh.

Between 1790 and July 28, 1836, a total of 9,957 patents were issued, and between 1836 and 1850 the number was 6,980. By 1918 the number in a single year had mounted to 38,569. Letters patent for 1934 numbered 48,523, and for 1935 there were 41,621. Here it is of interest to note that the number of patents *per capita* in this country has not increased in over half a century. It has been estimated that of all industrial enterprises, seven eighths are dependent directly or indirectly upon our patent system, or owed their being originally to the patent law.

Book of the Month

As books on science and engineering are published *The Review* appraises them and selects for comment those which are important or those upon which we feel our readers would welcome authoritative judgment. This month Philip Morse reviews on the next page "New World Picture" * by George W. Gray.

* Boston: Little, Brown and Company (The Atlantic Monthly Press), 1936. 402 pages, \$3.50.



Bureau of Reclamation
Prelude to dynamite. Drilling squad on east abutment of Grand Coulee Dam. This \$63,000,000 project will require 14,400,000 cubic yards of excavation

GEORGE GRAY is to be congratulated on having written a popular, nonmathematical book on modern physics which does not mix science with religion and amateur philosophy. I consider his book to be one of the best I have read in the past several years.

The time is ripe for books like "New World Picture." Physics has just emerged from a ten-year struggle with the problem of atomic structure, and is at present enjoying a short breathing space before attacking the mysteries of the nucleus. During the struggle, many beautiful theories had to be discarded and many concepts changed, but the result has been greater unity and a tremendous advance in our understanding of the nature of things. By means of the present theory we are able to work out the chemical and physical relations between atoms and molecules and crystals. There are, of course, many problems still untouched; but these are mainly concerned with applying the general theory to specific cases. They are more of the nature of detailed investigation than of frontier exploration. In another ten years or so physics will be engaged in another struggle with the problem of the nucleus. The battle will probably be on as wide a front as the atomic one, now nearly finished. As many theories will have to be modified in explaining the nucleus as were changed by the concepts of the quantum theory; but before this struggle begins we now have a short lull in which to consolidate our position and to survey our present knowledge.

"New World Picture" is an excellent example of a survey of the present physics. It does not confine itself to the more romantic and less fundamental parts of our knowledge, but it tries to give a connected picture of the



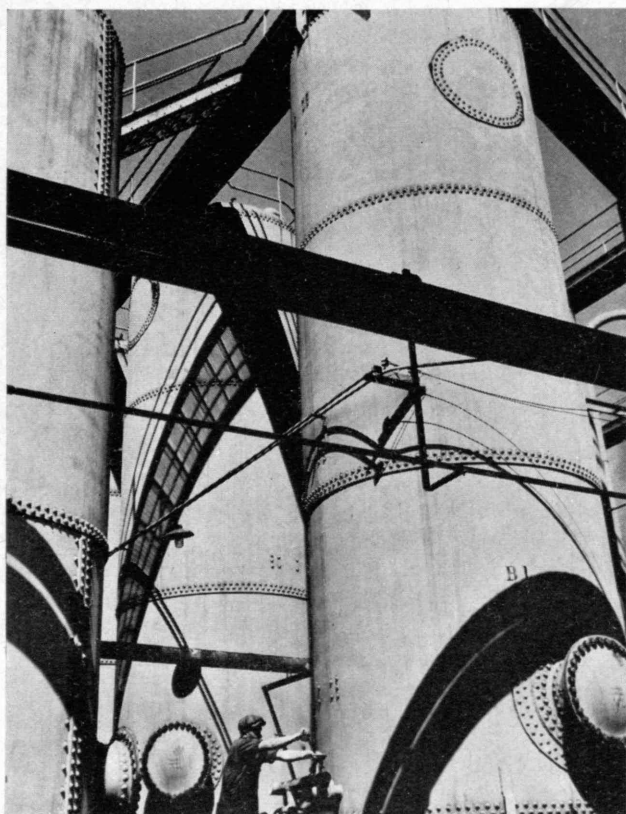
Young and Phelps

Unloading an ore boat at steel plant

whole field. The first half of the book concerns itself with new developments in astrophysics. It reports the recent findings about the shape and size of the universe and our state of knowledge of the evolution of stars. A section is devoted to the rôle general relativity has played in clarifying this knowledge; but Mr. Gray rightly places relativity in a subsidiary position in the general astronomical picture. He spends as much time on the constitution of star clusters as on the curvature of space. It is a pleasure to see a popular book with a proper perspective in such matters.

The second half of the book concerns itself with atomic physics. Here the subject matter is more difficult of exposition than that of astrophysics, though it is just as exciting. Mr. Gray has been fairly successful in conveying the fundamental ideas in simple language. In a few places, notably in the section on waves of probability, the reviewer believes that a simpler, more graphic picture could have been presented; but on the whole the exposition is as clear as the complexities of the subject allow.

Probably the most important group of ideas which a writer of popular science must convey is that concerned with the *method* of science: the way a scientist goes about understanding new phenomena. It is this scientific method which endures even though theories are modified and discarded; it will be science's most valuable contribution to human progress. Mr. Gray brings out the method of science by treating his subject in an historical manner. He discusses the problems that confronted physics in the 1900's and shows how they were solved, one by one — only to bring forth new problems. He emphasizes by numerous examples the necessarily

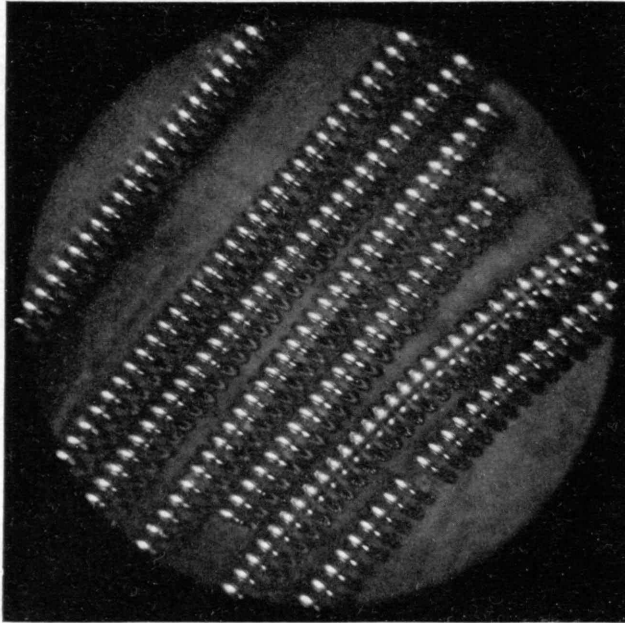


Young and Phelps

Continuous treating plant for purifying gasoline

tentative nature of all scientific theories, and illustrates how valuable these theories can be even though they are tentative. More books should be written on this subject, for it is the most important thing science has to teach the layman. One can hope that sometime the scientific method can be used even in social and political problems.

It is a sign of America's scientific maturity that several excellent semi-popular books on physics have been issued in this country in the past year. Harvey Lemon's



Ralph P. Johnson

Photomicrograph of coil filaments from a 25-watt tungsten lamp

"From Galileo to Cosmic Rays," and Lindsay and Margenau's "Foundations of Physics" are indications that American physicists are beginning to look beyond the narrow limitations of their individual specialities to view science as a whole. Mr. Gray's more popular book is a further indication of this trend. Let us hope there will be more like it.

Brine

GREAT SALT LAKE, the residual of prehistoric Lake Bonneville, last autumn was at its lowest level in recorded history due to five years of drought, with the result that the salt content reached the saturation point of 22.4% and crystals seized upon any immersed object to find a permanent mooring place.

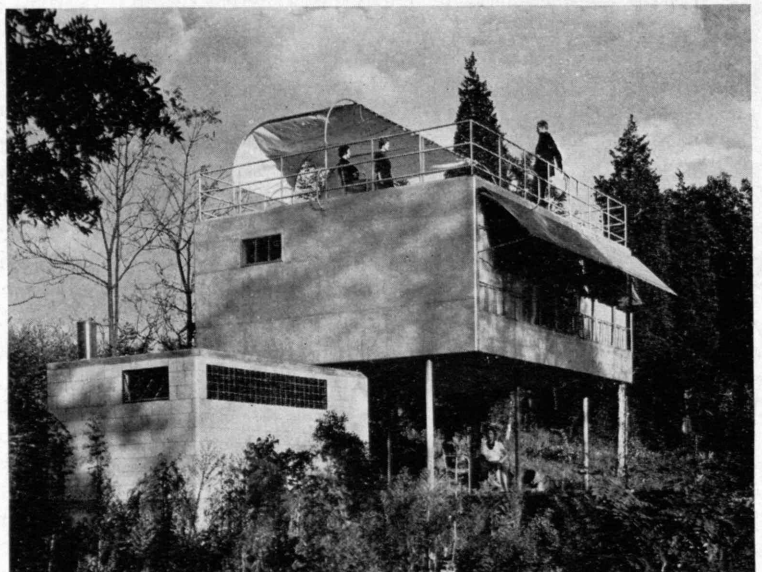
On the next page, for example, is a photograph of the results produced upon a model passenger locomotive, for which illustration *The Review* is indebted to Walter H. Trask, Jr., '06, as it is also for the information that the run-off from heavy snows in the mountains this past winter has already caused a rise of about a foot in the lake level, thus beginning the cyclical variation anew.

Originally Lake Bonneville covered an area of almost 20,000 square miles and extended into Nevada and Idaho. Its greatest length, north and south, was 346 miles, and the greatest width, east and west, was 145 miles; its mean depth was 800 feet. Its shore lines, distinctly traceable on the mountainsides about 1,100 feet above Great Salt Lake, indicate that Lake Bonneville originally was but slightly smaller than Lake Huron with a shore line of over 2,500 miles. Some 600 feet above the present lake may also be traced the outlines of what is known as the intermediate, or Provo level, to which it is supposed Lake Bonneville receded when its waters broke through Red Rock Pass into southern Idaho to pass through the Snake and Columbia rivers to the Pacific. This recession, it is estimated, took place during a period of about 25 years.

With an annual evaporation of almost seven feet over the present area of about 1,700 square miles, Great Salt Lake, although it has no outlet, naturally drops in level and increases in salinity when a deficiency in natural precipitation causes the Jordan, Weber, and Bear rivers to fail to supply the lake with sufficient fresh water. Its current brininess is strikingly illustrated by the fact that a Douglas airplane lost in its shallow waters last October became salt encrusted and was discovered only months later by dragging midway between Stansbury and Antelope Islands about 22 miles north of Black Rock. Another of Mr. Trask's photographs on the opposite page shows the salvaged plane being hoisted from the water by a railroad crane to be loaded for shipment to California for examination.

Cancellations

TWO weeks before Christmas of last year a ten-year-old boy was taken, an emergency patient, to a New York hospital. He had been playing football, had been struck by an automobile, and had been left lying un-



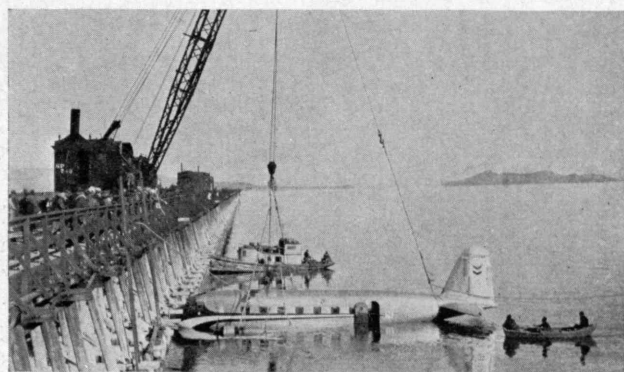
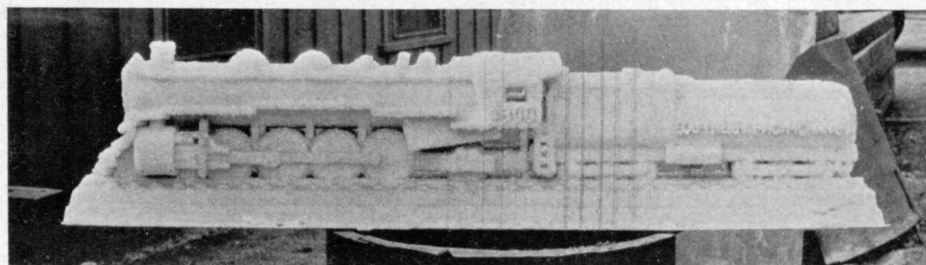
F. S. Lincoln, '22

Long Island week-end house of A. Lawrence Kocher, '13, designed by himself. The main portion of the house is canvas covered; the small addition on the left has a steel frame with terra cotta veneer and glass brick windows

SALINITY: 22.4%

Right. Salt-frosted model locomotive after immersion in Great Salt Lake

Below. Salvaging the airplane lost in Great Salt Lake last October. When found it was encrusted with salt. See opposite page



conscious in the street, his brain exposed where part of his skull had been torn away. Doctors expected him to live but a few hours. Three months and a half later he was released from his hospital room, sound and normal though still subject to periodic changes of dressings. Infection of the exposed surface of his brain, with probable consequent meningitis, had been averted by means of irrigation maintained constantly for a period of weeks; a new covering had formed over his brain — though the opening torn in his skull by the impact of the car still remained. It is expected that new bone will close this hole within a few years; if it does not, a silver plate may be inserted.

This phase of the boy's case points vividly to advances which have been made in emergency hospitalization, in antisepsis, in surgery, and in medical science. The inanimate and consequently blameless machine responsible for his nearness to death may be considered the second phase of the case, and is the product of comparable advances in invention, in manufacture, in engineering, and in the development of resources.

Two more aspects, however, remain in this case and in all others similar to it. They point to no progress; rather, if indeed they do not indicate backslip, they indicate stagnancy. The fact that the boy was playing his game in the street intimates that he had nowhere else to play. The operator of the machine which ran him down went

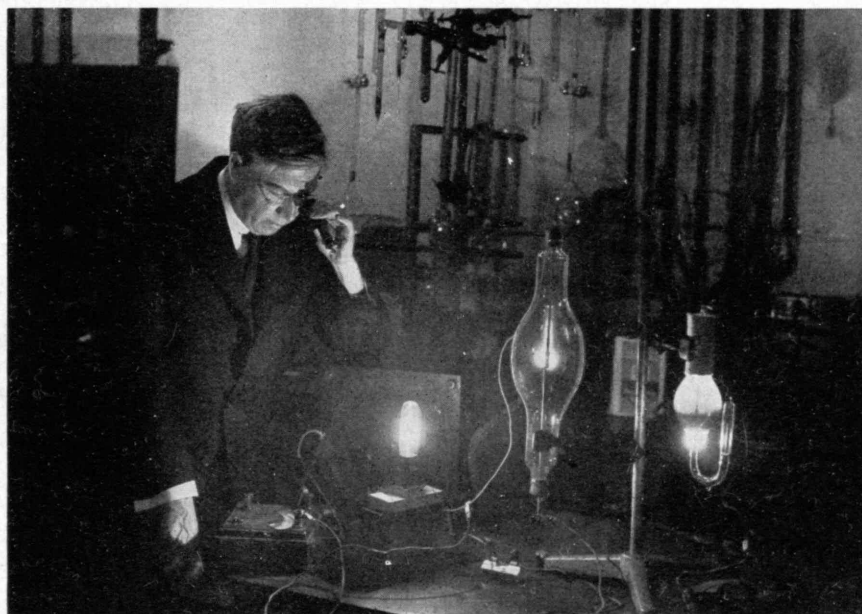
uncaught and unpunished. That engineering which manipulates humankind and which we call political or social is obviously deficient.

In the driver who stepped on the gas and scuttled out of sight after the crunching instant, the sense of ethical or social responsibility or ordinary human decency could have had little more, if not less, vitality than it had in the days when the unwanted child was knocked on the head by its own father. If we consider the development of ethics comparable to science in its delicacy and its selflessness, the human science involved in this case is likewise a weak and faulty thing.

It is ironic refutation of aspiration for the achievements of the race in the first two fields that it be nullified by consistent failure in the others. If that nullification is to be allowed unchallenged, the achievements may become no more than palliatives of evil.

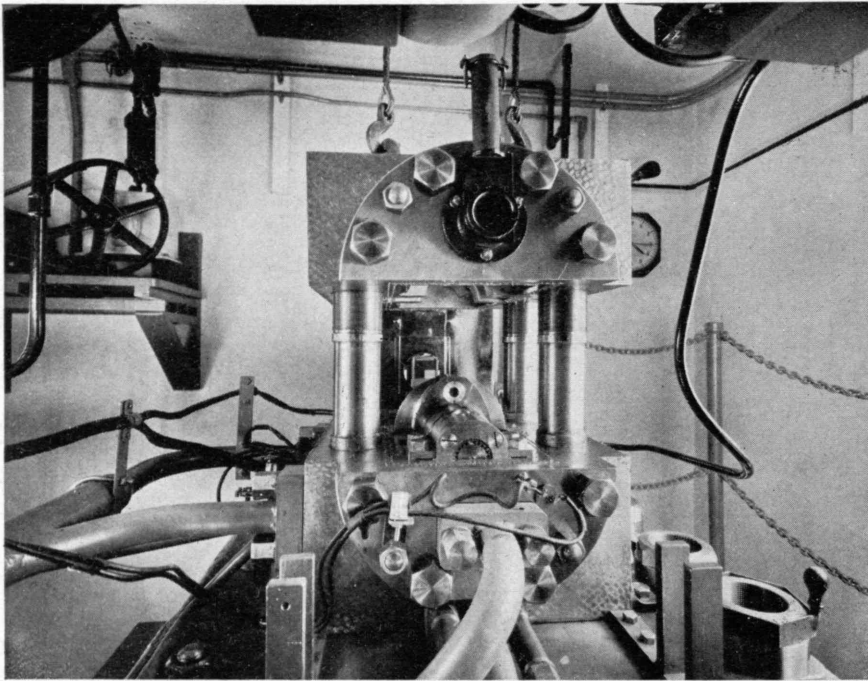
Vignettes

THE Firestone Rubber Company is experimenting with a rubber spring for automobiles that works somewhat like a bellows. The device consists of two



Science Service

The new "peanut" light (left), developed by the Westinghouse Lamp Company, is claimed to be man's brightest source of light. A small globule of metallic mercury, in a tiny quartz tube about the size of a roasted peanut in its shell, vaporizes when submitted to an electrical discharge, and sets up a brilliant glow of light similar in color composition to that of sunlight. Dr. John W. Marden, Westinghouse research scientist, is comparing its light with that of a replica of the original carbon arc light developed by Sir Humphry Davy in 1813, (center) and a replica of Faraday's original mercury arc light dating back to 1835



Science Service

Ultracentrifuge, developed by the Swedish Nobel Laureate, Thé Svedberg, now in use industrially by the Du Pont Company. It whirls solutions with forces equal to 250,000 times the force of gravity. In the photograph the upper part of the housing has been removed to show the rotor, cell chamber, and bearing

rubber units connected by a hose to an air reservoir, and air movement between the spring and the reservoir cushions road shocks. Rubberized fabric is used in the units, which are reported to have passed, successfully, a test of 8,000,000 two-inch deformations under a heavy overload.

❑ The Thiokol Corporation of New Jersey reports development of a molding compound of synthetic rubber which may be formed as easily as phenol and urea resins. It is said to be fully vulcanized in the molded state.

❑ Carl Zeiss announces a new method of examining colorless objects under a microscope, a process which has always been difficult because of lack of contrast between the object and its background. A new device called the micropolychromar, which employs a diaphragm mechanism and colored filters, now makes it possible to color objects optically.

❑ In Germany one of the large engineering organizations is building for the German National Railways a motor car to be driven by steam from a boiler capable of generating pressure at 1,400 pounds to the inch. This system, which is called the Borsig drive, uses a steam motor, the details of which are not revealed. On the highways of Germany and France the Oberhaesli crude-oil motor appears to be gaining popularity as a power plant for pleasure automobiles. A French car was recently driven 15,000 miles with a crude-oil consumption of less than four gallons per hundred miles. Fuel costs are said to be reduced from 60% to 75% under those of gasoline.

❑ The old problem of treating sea water for use in boilers and for other industrial applications is being attacked by the National Physical Laboratories of Eng-

land by a new method. The salt water is first passed through tubes composed of synthetic resin made of tannic acid and formalin. The tubes absorb into their walls all basic metallic or alkaline elements. After this treatment the water is passed through tubes made of formalin and aniline, which remove acid-forming chemicals.

❑ Limestone in colors such as red, purple, lilac, brown, and green may soon become common as interior decoration, for a process of impregnation has recently been developed which will make possible such coloring of this building material.

❑ A new instrument which should be invaluable to those engaged in the study of metals has recently been built. It is called a dilatometer and is capable of recording and measuring in ten thousandths of an inch the expansion and contraction of metals as they are heated and cooled.

❑ The Owens Illinois Glass Company is reported to be drawing

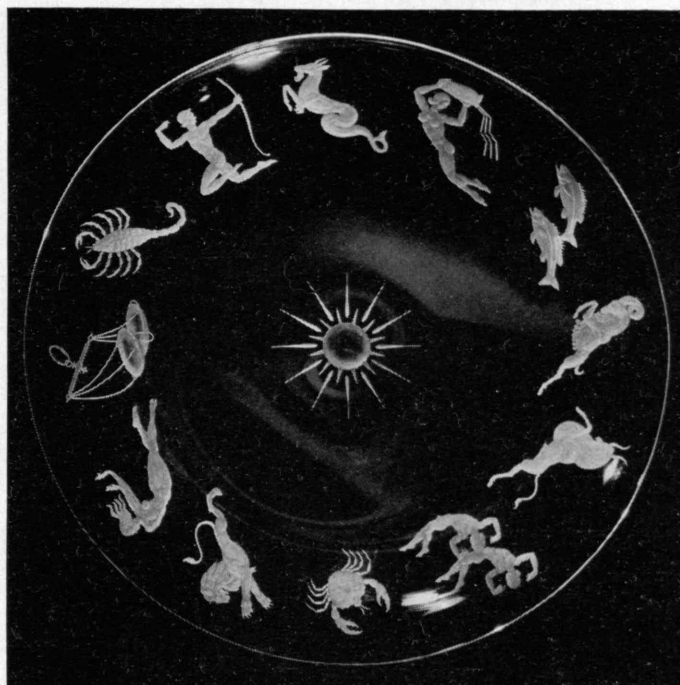
fibrous glass for textile purposes at a speed of 50 miles a minute. A pound of glass can be drawn in a single fiber to a length of more than 25,000 miles. This strand is reported to be one twentieth of the diameter of a human hair, so fine that more than 100 would be required to equal the size of ordinary sewing thread. Incidentally, the speed of drawing the fiber is five times that of the flight of a Springfield rifle bullet.

❑ The Vermont Marble Company announces a method for bringing out the natural internal beauty of marble: The product is Lumar, a scientifically selected and specially processed marble which provides beauty and light in an entirely new form. Ordinary electric light bulbs are used as the source of light, but since the marble is translucent, high wattages are not necessary. The surface illumination of Lumar is never spotty nor uneven.

❑ Two new products recently placed on the market should make life a little pleasanter for those who have to do much walking indoors. One is a nonslippery floor wax whose novel characteristic is a "higher coefficient of friction." This quality is said to make it much less slippery than ordinary waxes and is obtained by adding approximately 10% of high-grade, light-colored raw rubber to the mixture of beeswax and carnauba wax used in making most floor waxes. The other new flooring material already has a trade name—Permex. Floors covered with it can resist indentation from the heaviest loads of furniture and the other advantages claimed for it are that it is nonabrasive, does not absorb oils or stain easily, does not become sticky or rough, and is not at all affected by lighted cigarette butts. Permex is made from the bark which has long been an unused by-product of paper manufacturing.

THE ZODIAC BOWL

Right. Adding to the laurels which he has won in the field of sculpture, Sidney B. Waugh, '27, three years ago undertook designs for Steuben glass. Of the many noteworthy engraved pieces which he has since executed, one of the most famous is the Zodiac Bowl which is now in the permanent collection of both the Metropolitan Museum of Art in New York and the Victoria and Albert Museum in London. The bowl derives its name from the twelve signs of the Zodiac which form a continuous band of decoration around its circumference



Corning Glass Works

THE GAZELLE BOWL

Below. Another example of Sidney Waugh's beautiful glass designs is the Gazelle Bowl, a replica of which has been purchased by the Metropolitan Museum of Art in New York. The bowl rests on a base of solid crystal in the form of four flanges joined at their intersection. Twelve leaping gazelles decorate the bowl, each antelope representing a different phase of the jump. The transparency of glass, which permits both sides of the bowl to be seen simultaneously, gives an illusion of movement not obtainable in any other medium

Science and the Fine Arts

Does Technical Education Debase Esthetic Appreciation?

BY RALPH G. HUDSON

ONE of the unfortunate consequences of modern specialization is the traditional assumption in one group that no other group may be expected to comprehend its aims and ideals or make an important contribution to its field of activity. History indicates no such compartmental limitation of genius. Leonardo da Vinci was probably the greatest engineer of his period and at the same time a master of classical painting. Thomas A. Edison hung on the wall of his office a single framed aphorism which said: "There is no expedient to which man will not resort to avoid the real labor of thinking." The author of this inspiration to Edison was Sir Joshua Reynolds, the eminent English portrait painter. Charles L. Dodgson was known at Oxford University as a professor of mathematics but is known to the world at large as Lewis Carroll, the author of "Alice's Adventures in Wonderland."

Although progress in science is a highly imaginative process, science itself is too often associated with materialism by the laity. Many times it has been represented as incompatible with religion and culture. With the inference that the world has suffered from its activity, science has been urged to take a holiday. It has been cited as the cause of industrial

revolution and has frequently been given the sordid credit for the cruelties of warfare. In spite of the impressive beauty of a bridge, a cup defender, or an ocean liner, science is not generally associated with the esthetic works of man. The fine arts are usually considered to be beyond the pale of the scientist because it is assumed that he lacks constitutionally the fundamental emotional impulse.

Until recent times the fine arts formed a rather exclusive club. There were only five members in good standing: architecture, sculpture, painting, music, and poetry. Auguste Comte, the French philosopher, not only restricted their content, but insisted that the order should be arranged, as stated, to indicate their increasing importance. Our confidence in his infallibility may be shaken somewhat by another of his dictums in which he said: "There are some things of which the human race must forever remain in ignorance; for example, the chemical composition of the sun and the other heavenly bodies."

The general definition of a fine art is any production of man which possesses beauty; it may or may not have a useful purpose but must first create an emotional sense of delight.



Corning Glass Works



Peter A. Juley and Son

MID-OCEAN

Illustrative of the sea paintings of Charles Herbert Woodbury, '86, is this one with its realistic mid-ocean waves. The artist is one of several Technology graduates who have distinguished themselves in the field of painting. Mr. Woodbury has written several books on the subject of painting and his pictures have won many medals and prizes

The complete definition must include many other fine restrictions. The sense of beauty, for example, must enter the brain either through the optic or the auditory nerve. No matter how beautiful an *hors d'œuvre* may be, it cannot be hung in exhibition because it is made essentially to please the taste. The originator of a new exotic perfume will win no more *médailles de beaux arts* than the owner of a pigsty. There is, of course, considerable diversity of opinion as to the specification of beauty. Somebody has said that "beauty is in the eye of the beholder." In architecture, many devotees of the fluted column have not yet bowed to the radiator fins. In painting, the sunflowers of Van Gogh and the cubistic "Nude Descending a Staircase" may provoke opposite impressions. In music, the admirer of the Beethoven "Fifth Symphony" may not be thrilled by the "Soviet Iron Foundry." The effect of poetry is always a gamble. Some prefer to breathe deeply with "Horatius at the Bridge" while others must wander through "The Garden of Proserpine."

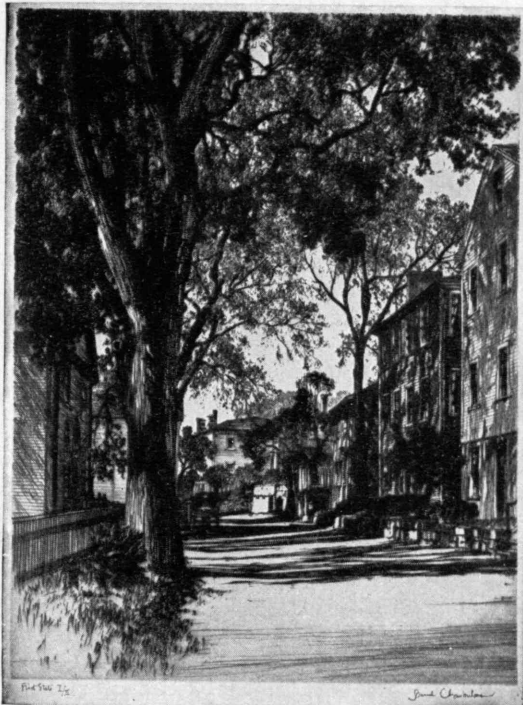
There are two important questions to be raised regarding the popular opinion of the relationship between science and the fine arts: The first is whether a scientific or technical education inhibits or debases an appreciation of the fine arts; the second is whether science in itself is noncoöperative in the development of the arts.

It would be difficult if not impossible to measure the relative esthetic propensities of the graduates of liberal arts colleges and the engineering schools. Since "creating and not possessing is the essence of culture," it should be more convincing to examine the accomplishments of some of our own former students and determine from that record whether a technical education may be expected to restrain all interest in the fine arts. It is furthermore intended to exclude all transfer students. Much as we appreciate their influence, it will be more significant to include only those Alumni who began their college training at the Institute.

In the realm of architecture there are few communities in the country in which the sky line is not blocked out to some degree by the hand of one of our graduates. The preëminence and accomplishments of our School of Architecture are too well established to require detailed elaboration. It is, moreover, a field in which an appreciation of the fine arts is to be expected.

With reference to sculpture the best known statue in the Harvard Yard is that of John Harvard. This was done by the late Daniel Chester French, '71. This is an achievement, and the difficulty of its execution will be better appreciated if it is realized that nobody knows what John Harvard looked like. Other well-known statues produced by French are the Minute Man of Concord, the Alice Freeman Palmer Memorial at Wellesley College, General Cass (in the National Capitol), Rufus Choate (Boston Courthouse), and the Statue of the Republic (World's Columbian Exposition). Darragh de Lancey, II, '90, after retiring from a successful career in business, has turned his attention to sculpture. His best known productions are Exedra at Great Barrington, Mass., and the War Memorial at Newtown, Conn. Sidney Biehler Waugh, IV, '27, won the *Prix de Rome* for sculpture in 1929, and was awarded the prize exhibit in the 1934 salon of American hand-made glass.

In the field of painting, Charles Herbert Woodbury, II, '86, is an eminent painter of sea pictures and is unsurpassed in his paintings of ocean waves. He has received 20 medals and prizes for paintings and etchings and is the author of several books on painting. Philip Little, IX, '79, has received many medals and prizes in various exhibitions. His paintings are included in the permanent collection of several museums and art galleries throughout the United States. Edwin Howland Blashfield, '69, has painted murals and ceilings in many state capitols, courthouses, churches, colleges, private homes, and our own Walker Memorial. His decoration



Courtesy Goodspeed's

"Summer Street, Marblehead" is one of the latest drypoints done by Samuel V. Chamberlain, '18. Since returning to this country from France, Mr. Chamberlain has been giving a course in the graphic arts at M.I.T.

of the great central dome in the Library of Congress is well known. He ranks among the greatest of the mural decorators in America. Charles Bittinger, '01, has been honored by many medals and prizes for his paintings, and Isaac Brewster Hazelton, IV, '94, is a prominent painter of portraits. Edgar Irving Williams, IV, '08, is a prominent architect who has also won distinction as a water colorist. Joseph Paul Gardner, IV, '17, is the director of the Nelson Gallery of Art in Kansas City. Among the Alumni of our School of Architecture are several men who have received wide recognition as etchers of unusual merit. To connoisseurs of fine etchings perhaps the best known are: John Taylor Arms, '11, Samuel Vance Chamberlain, '18, Louis Conrad Rosenberg, '13, and George Canning Wales, '89.

In the realm of music Arthur George Farwell, VI, '93, has been a lecturer in music at Cornell University, the University of California, and Michigan State College. He has composed American Indian melodies, vocal and orchestral music for pageants, and has directed concerts and musical festivals throughout the country. The late Frederic Field Bullard, '87, was a transfer from Dartmouth and is mentioned here, rule or no rule, because all Technology men acclaim him especially as the composer of "The Stein Song."

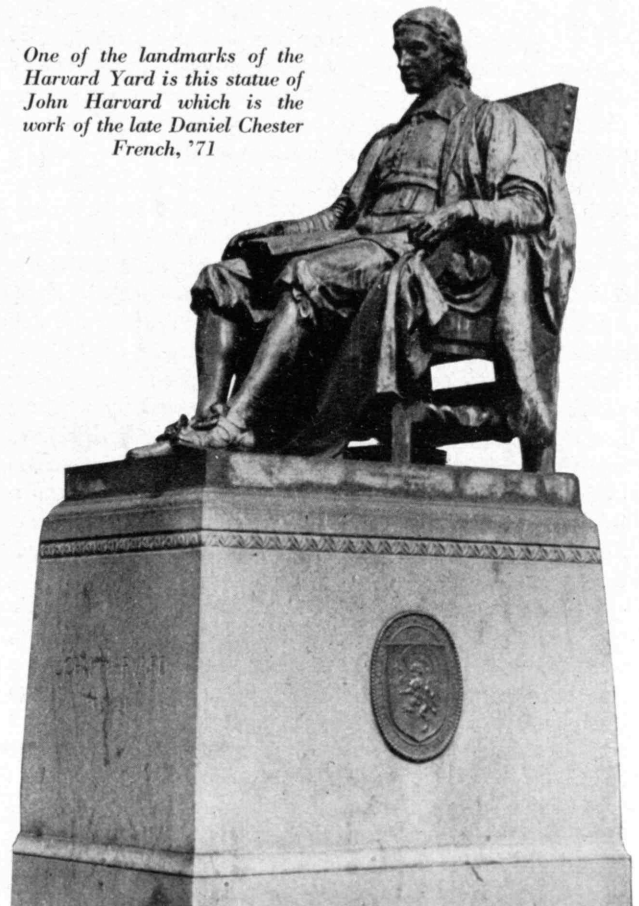
In his recent autobiography, "And Gladly Teach," Bliss Perry says that it "was once remarked of a venerable Oxford don who refused to retire, that he had all the Christian virtues except resignation." This cannot be said of our Alumni with reference to their production of poetry. There are poets among the Alumni, but whether their virtues be resignation, modesty, or hu-

mility, their collections are peeked at only on rare occasions by close friends. The public is probably most familiar with the whimsical poetry of Gelett Burgess, I, '87, especially the one that begins:

"The Goops they lick their fingers,
And the Goops they lick their knives."

Although not included in the old classification, the modern concept of the fine arts includes the higher forms of prose. Allen French, IX, '92, has published 21 volumes of fiction and for six years was an instructor of English at Harvard University. To those who appreciate the anomaly, this might be called the reverse English. Gelett Burgess (mentioned above as a poet) is the author of more than 30 books and plays. Francis Russell Hart, VI, '89, during a busy career as a banker, has written three captivating volumes relating to the early history of the Caribbean. The late Arthur Dehon Little, V, '85, gained a host of admirers through his brilliant contributions to the *Atlantic Monthly*. The late Charles Russell Richards, II, '85, was the author of various books on industrial art and received the gold medal of the Architectural League of New York in 1936 in recognition of his service to the arts of decoration. Stuart Doane Chase, IX, '10, although writing in the field of economic research, has attracted a wide circle of readers by 12 popular books which are distinctive for their vigorous literary style. Irving Fineman, I, '17, is a professor of English and American literature at Bennington College and is the (Continued on page 356)

One of the landmarks of the Harvard Yard is this statue of John Harvard which is the work of the late Daniel Chester French, '71

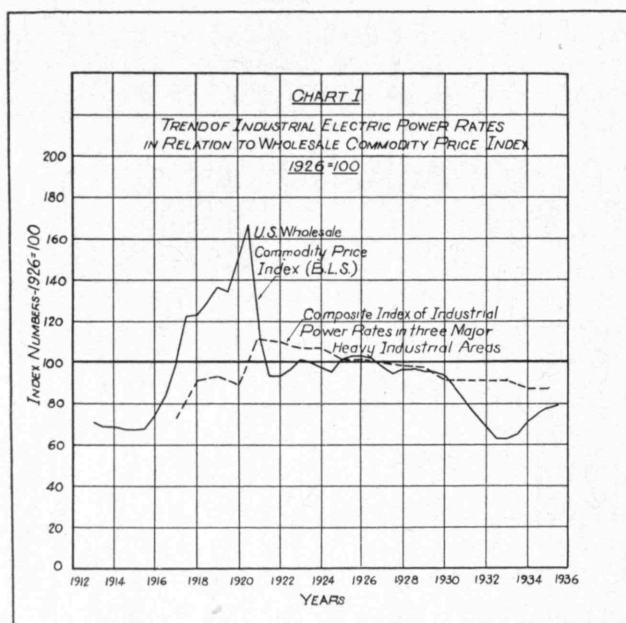


Keystone

The Story Behind

Facts and Fancies

BY MALCOLM



Editorially The Review eschews any stand on the question of public versus private ownership of public utilities. It nevertheless welcomes the opportunity to present the following discussion, by a rate expert, of the factors which determine electric rates, the trend of these rates, and the economics of "yardstick" systems. — THE EDITOR.

RECENT agitations concerning rate levels in the electrical industry have been built around the allegation that the charges are too high for the service rendered and that this condition has largely developed as a result of the absence of competitive influences which, if present, would automatically act to reduce these prices. From this premise there has developed the philosophy of governmental construction and operation of competing utility systems, euphemistically called "yardstick" plants because they are supposed to present a measure of the cost of electrical service. A second premise is that lower rates will result in wide increases in the use of energy which, in turn, will materially improve the standard of living.

The yardstick movement has an undeniable appeal, particularly to those who see in it a means by which a few dollars may be pared from the electric budget and transferred to the movie, the cigarette, or the gasoline budget. This appeal is made to the superficial opportunism that exists in a large majority of persons. Can, however, such a program be justified upon the ground of lower costs?

Let us look at the record. Yardstick municipal plants are being constructed on the basis of Federal financing, with from 30% to 45% of the investment conveyed as a grant. Is this a proper yardstick with which to measure the costs incurred by private capital in rendering the same services? Not only must private enterprise finance the full investment in plant, but it must also pay taxes which, in 1934, amounted to approximately 14% of the total revenue received. If investment grants must be given and a portion of existing tax revenues waived (due to the elimination of private enterprises) in order

to make governmental operation a success, it is apparent that the so-called success achieves its short-lived existence through an ultimate increase in the general tax burden.

The premises upon which the supposed necessity for governmental operation of utility services are predicated should be given thoroughly objective consideration. If they are nonexistent, and if the past history of governmental operation does not indicate success in achieving costs lower than private operation, it can be assumed that motives other than sound economic principles form the basis for the agitation. If economic justification is absent, the alleged power yardstick becomes, in fact, not what it has been termed by one protagonist of governmental operation, a "birch rod" with which to chastise a "naughty" industry, but a very real and very dangerous club being wielded with reckless abandon.

The Effect of Competitive Influences

The rendering of utility services forms a business that is properly classified in the category of "natural monopolies." Units of the industry are most economically operated as monopolies, within each individual's sphere of operation. This is a natural development of the fact that extremely heavy investments are required per unit of revenue, which investments under normal conditions generally range from five to seven times the annual revenues. Duplication of a large portion of the physical structures develops if more than one unit serves the same customer group. The result of such duplication is either higher costs or eventual bankruptcy through "cut throat" competition; either alternative results in economic waste.

Too frequently the monopolistic nature of utility operations leads to the assumption that the industry is not subject to competitive influences. This conception is far from true even though there usually exists no direct competition between units serving the same commodity. While this latter form of competition, *i.e.*, that existing between price for and quality of an identical article or service, is largely absent, there are other more subtle forms of competition, the incidences of which have a very definite effect upon the price structure of the industry. The competition that is offered by other methods of obtaining results identical to those that can be secured from electric service and the competition of entirely different services and commodities for a share of the prospective customer's dollar form the two major competitive influences. Of lesser importance and applying generally only in the sale of electric service to industry are the competitive influences offered by location with respect to markets, labor, and raw materials, and by the price structures of adjacent systems. These latter

Your Light Bill

about Electric Rates

G. DAVIS

two are of a rather specific nature and vary greatly with each particular instance.

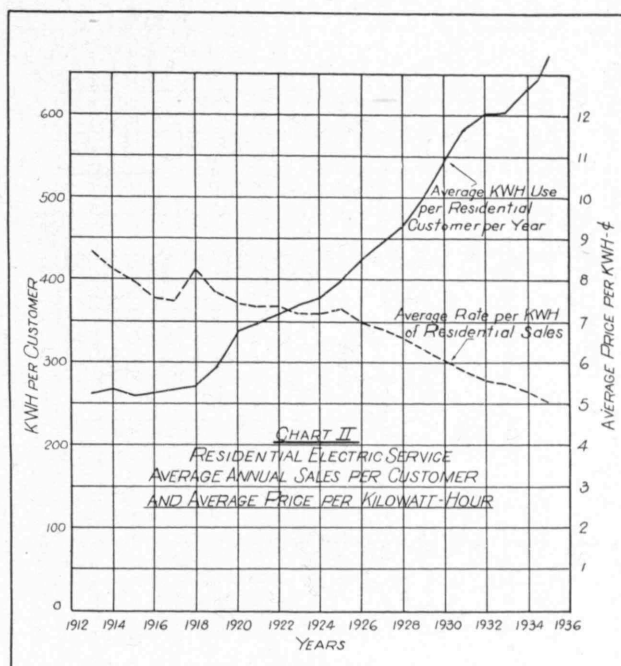
These several competitive influences have two diverse effects upon rate levels. One is the natural reaction of price pressure which tends to bring rates lower as markets are expanded, while the other acts to inhibit, in individual instances, the further reduction of rates due to the existence of economically unassailable competitive barriers raised by other methods and forms of rendering the same services. By "economically unassailable" is meant that the service would have to be rendered at less than cost in order to meet the price of equally good competitive services. Competition under such conditions is economically unsound.

The most easily evaluated form of competition is that which exists in the field of large industrial power sales where the application of central station service is controlled largely by the competitive levels set by the costs of operating industrial generating plants. These competitive values to a major degree determine the level of industrial power rates. It is to be expected, therefore, that the level of industrial power rates will vary within a pattern determined by the cyclical changes in the general price structure. This condition is evident from an inspection of Chart I, which shows, in index form, the trend of industrial power rates in comparison with the United States Wholesale Commodity Index as prepared by the Bureau of Labor Statistics.

Because many of the costs entering into utility operations are relatively fixed, and the balance is not so volatile as are a majority of the components of the general price structure, the fluctuations in industrial rate levels will not be so violent as those occurring in the index of wholesale commodity costs. This fact is borne out by the results recorded on Chart I. Thus, wholesale prices increased nearly 150% from 1913 to 1914 levels to the 1921 maximum; industrial power rates increased only 60% in the same period.

A high degree of inertia to rate changes resulted in a somewhat slower decline from peak rate levels to those of 1925 to 1928. Inertia to change, however, was itself the result of certain basic causes. Thus, many of the cost components of utility service did not decline so rapidly as did the general price structure; also investments incurred at the time of peak prices were still on the books exerting their influence upon rate levels. These same factors controlled the trend of competitive costs so that competitive pressure did not immediately increase in direct proportion to the decline in the general price structure.

During the period 1929 to 1933 when the general price structure collapsed, industrial power rates did not decline proportionately. Two factors exerted a definite influence during this period, the more important being

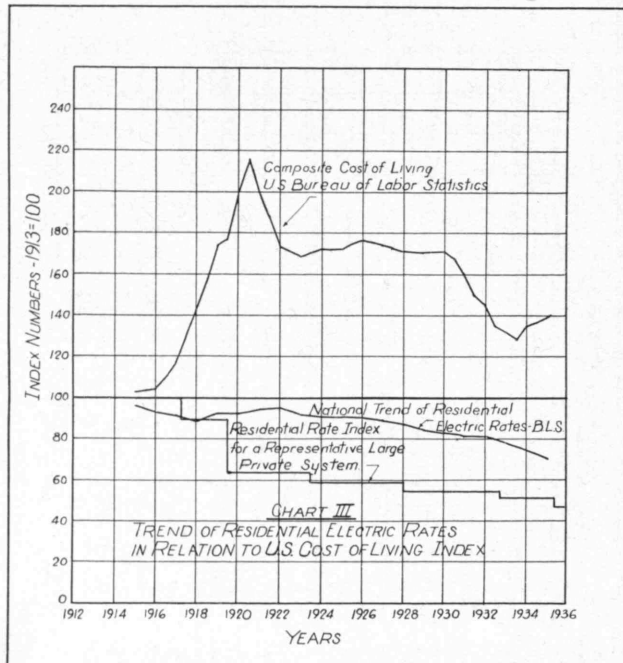


that there was little or no new load to be obtained and the other that existing customers were not in position to risk the investment necessary to construct private plants to serve their requirements; in other words, the competitive influence became temporarily noneffective. Of even greater importance is the fact that utility earnings were drastically reduced due to failing loads, and the industry was in no condition to meet theoretical competitive levels. Even so, temporary concessions were made by various companies in an attempt to induce some expansion in use and, in some instances, actually to prevent customers from closing down operations entirely. These temporary concessions cannot be evaluated in the type of index here presented.

With the firm trend of prices evidenced during the past several years, it is probable that rate levels for industrial power service will not be forced materially lower by competitive influences, except in individual cases where industrial rate structures may not have been previously reduced below the 1925 to 1928 level.

The volume of large commercial and industrial power that may be sold by any system is dependent not only upon the rate level of the system but also upon the degree of industrialization of the area served. This latter factor is usually controlled by the location of the territory with respect to markets and raw materials. With the exception of specialized processes, the cost of electric service is such a relatively small part of the total cost of manufacturing that industry does not generally follow low rates. Rather the reverse is the usual experience, so that it is found that extensively industrialized areas will generally have lower rate levels for large power loads, all other factors being equal, than will the less highly industrialized areas.

The competitive situation, with respect to the small commercial and residential customers, differs materially from that of the large commercial and industrial groups. With the small customer there is no question



of competition between price levels set by privately owned sources of supply and the price of central station service; there is only one economical means of obtaining electrical service, and that is the central station system. Beyond certain minimum requirements, however, the development of sales in the small customer categories is definitely competitive. In this field the most potent competitive factor controlling the exploitable markets is that which arises from the cost and quality of identical services from other sources. Two obvious examples of this form of competition are gas cooking and water heating, as compared competitively with the electric range and water heater.

The competitive levels imposed by these other sources of service are frequently so low as to make impossible the development of large markets for electricity at prices that will not result in actual out-of-pocket losses. If relatively low gas rates are available, competitive dollar values for electrical cooking and water heating may be below production costs. Where this is true it is uneconomical, from the standpoint of the utility company and of the community as a whole, to attempt to develop sales in these categories, except to those customers in the higher income brackets who are willing to pay a higher price for certain advantages that they may consider to exist in the more expensive service.

Due to the inherent characteristics of utility costs, it is necessary to obtain large volume and extensive utilization of facilities, *i.e.*, high load factor, in order to make low rates economically feasible. Where competitive price barriers exist it is impossible to develop the sales volume necessary to support extremely low rates; hence reductions in rates, in the range of uses that are characteristic of these marginal services, can only result in decreased revenues with consequent impairment of economic position. No offsetting advantage to a major portion of the consuming public results from such reductions.

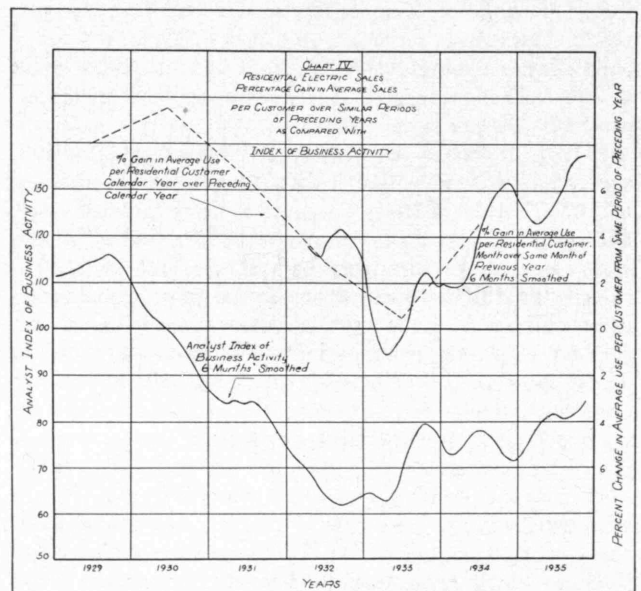
More subtle in its action is the competition that exists between other uses for the customer's income and the various semiluxury and luxury uses for electric service. For lack of a better term this may be called "budgetary competition"; thus a customer with a limited income must choose between an increase in his electrical utilization at a given rate level and a reduction in his expenditures for other commodities and services.

Because of this fact a wide reduction in rates for electric service, unless accompanied by extensive selling efforts, may result in nothing more than a realignment of the proportionate distribution of expenditures, with the resulting savings in costs, for a given quantity of electric service, being transferred to other categories of expense. However, with effective sales and market-development activities, it has been the general experience that reasonable revenue reductions can ultimately be recouped from increased sales. Nevertheless, revenue recuperation is a function of the breadth of the potential market as measured by the cost levels of competitive services and by the existing degree of sales saturation.

The process of reducing rates for residential service is necessarily slow, requiring, at each step, a proper evaluation of future sales possibilities, and of the effect of such sales upon system investment and operating costs. Particularly important is a proper evaluation of future sales possibilities, for if sales do not materialize, the financial position is permanently impaired. Furthermore, low prices do not in themselves guarantee proportionately higher use of service.

Trend of Residential Sales and Rates

An analysis of the history of the utility industry over the past 15 to 20 years indicates a continuous process of rate reductions accompanied by increases in the average use per customer in the residential category. These trends are shown graphically, on Chart II, in terms of average annual use per residential customer and average price per kilowatt hour sold. The increase in use per customer has been developed through the enlargement



of markets resulting from the development of new appliances and processes. These markets, however, have been developed only through the expenditure of extensive selling effort.

Increased use has acted to lower rates progressively, as is indicated by the trend of average price paid per kilowatt hour, because with increased volume there has been made possible a thinner spread of fixed costs to each unit of energy. This reduction in average price has also resulted from the phenomenal increases in operating efficiencies achieved by the industry during the period under consideration.

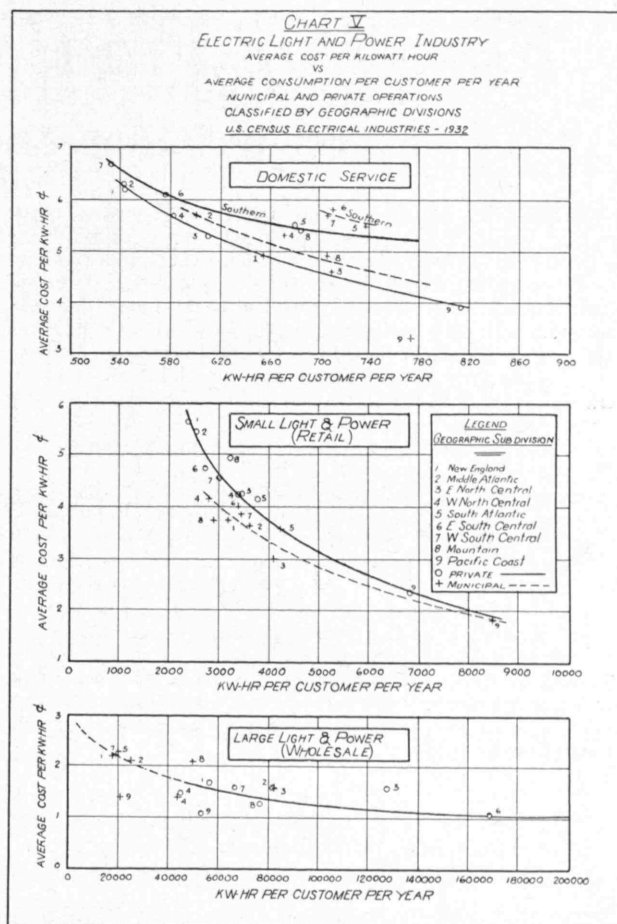
As indicated on Chart II the average sales per residential customer has increased more than twofold within the past 20 years; at the same time, the average price has been reduced to approximately three-fifths of its level at the beginning of the period.

Indicative of the differences in the economic characteristics of the residential and industrial rate structures is the fact that residential electric prices have shown little or no tendency to follow upward fluctuations in the general price structure. This condition is illustrated on Chart III, showing the United States Bureau of Labor Statistics' composite index of the "Cost of Living" and, from the same source, the index of residential electric costs. This latter index is based upon the costs of a fixed quantity of energy and as a result differs somewhat in relative values from the trend shown on Chart II. The latter indicates a somewhat greater reduction in costs due to the progressively larger quantities of energy that fell within the low price ranges of the various rate structures. To illustrate the general situation with a specific instance, there also is presented on Chart III the index of residential rate levels for one large metropolitan company. This history of almost continuous reductions in residential electric costs during a period in which other costs showed marked variations is a definite indication of the policies that have controlled the development of the electric utility business.

However, the trend of increasing average use of electric service has not been uninterrupted. Even in the field of domestic service the effect of economic conditions is felt; in other categories the direct incidence of economic conditions is even broader. Thus, small commercial sales declined in 1933 to 89.5% of the peak sales of 1930, and large industrial sales dropped in 1932 to 70.3% of 1929 peak levels.

The effect of economic conditions upon domestic service is graphically illustrated on Chart IV, which shows the trend of percentage gains in average use per customer over similar periods of the preceding years. In comparison with the trend of gains in average residential use, there is shown the combined index of business activity, as compiled by the *Annalist*. In order to eliminate extreme fluctuations in values, both curves are presented on the basis of six month average values, plotted to the last month of each successive six.

Although no annual loss in average sales was recorded, the percentage gains were cut from eight to ten per cent to less than one per cent. Increases in total sales declined to an even greater extent due to reductions in the total numbers of customers served. With a majority of industries recording heavy losses, it would seem that



gains, no matter how meager, are indicative of a particularly strong position. When it is realized, however, that capital investments, necessarily made in anticipation of actual needs, and reductions in rate levels are both made in expectation of a continuation of previously experienced patterns of load growth, it is apparent that a wide decline in the expected rate of growth is a serious matter.

That extensive rate reductions have been made during the years of depression is apparent from the index of rate levels shown on Chart III. This index declined 14.0% in the last five years.

As markets for electric service are further expanded, additional reductions in rate levels may be anticipated; but, unless operations are subsidized, it is financially impossible to make wide reductions very far in advance of increased sales. The two factors must be kept within reasonable balance of one another or an economically unsound condition results. On the other hand, if operations are subsidized, it is apparent that an over-all economic loss will be sustained by the community, due to sales expansion into markets where other forms of service are, in fact, more economical; furthermore, such procedure tends to expand markets into economic groups having little need for, or appreciation of, the marginal uses for the service.

Private and Municipal Plant Rate Levels

No discussion of electric utility rate levels or of the justification for govern- (Continued on page 354)

Five-Star Final on Alumni Day!

Technology's Homecoming Festival on June 8

FOURTEEN hundred and sixty-three Alumni already have indicated that they hope to attend the Alumni Day at the Institute on June 8 — a response that indicates the interest prevailing among Technology men and their families in this coming Festival, celebrating the Institute's 75th anniversary and the 20th anniversary of the removal to the present plant in Cambridge. Dedicated to pleasure and to an expression of Technology spirit befitting the two anniversaries to be marked, the Alumni Day program will provide opportunities for entertainment, renewal of friendships, and desirable educational experiences that will make June 8 an occasion memorable and delightful.

The program this year far surpasses last year's Alumni Day in interest and entertainment, and includes a number of innovations. Alumni will join with the senior class and their friends in the Class Day exercises of the afternoon, in the christening of Technology's new dinghy fleet, and in the dedication of the new sailing pavilion on the Charles. The feature of the morning will be the Conference on Transportation, designed to inform the layman about future trends in this field of universal interest. A luncheon in the Great Court for the Alumni, and a dinner and Pops concert in Symphony Hall are other items on the program which may be detailed at the present time as follows:

Program

9:00 A.M. AND ON. REGISTRATION and renewal of acquaintances in the main lobby of the Institute.

10:00 A.M. TRANSPORTATION CONFERENCE. The presiding officer will be the Hon. John Monroe Johnson, Assistant Secretary of Commerce, and the speakers, covering the four fields of transportation, include Edward P. Farley, President, American Hawaiian Steamship Company; Colonel Edgar S. Gorrell, '17, President, Air Transport Association of America; Edward W. James, chief, division of highway transport, United States Bureau of Public Roads; and Charles D. Young, Vice-president, Pennsylvania Railroad. These speakers will discuss the broad social implications of present-day trends in air, water, highway, and rail transportation.

1:00 P.M. LUNCHEON for all Alumni in the Great Court.

2:00 P.M. JOINT CLASS DAY EXERCISES with the senior class in the Great Court. The Class of 1911, holding its 25th reunion, is preparing a special stunt initiating the senior class into the alumni body, and thereafter the program, which will be in charge of the senior class, will include the christening of the

Technology dinghies, the award of class gifts, the Beaver oration, and the welcoming by the Alumni Association of the senior class into the alumni ranks.

4:00 P.M. DEDICATION of the new sailing pavilion in front of Walker Memorial, a sailing regatta on the Basin, and a water carnival. At the conclusion of the program on the river, Alumni will have an opportunity to visit members of the Institute staff and the departments and laboratories in the Institute.

6:30 P.M. GRAND DINNER IN SYMPHONY HALL. The speakers will be the Hon. Joseph B. Eastman, Federal Coördinator of Transportation (he will also participate in the morning conference), President Compton, and Dr. George E. Vincent. The latter will talk on "The Unpopularity of Brains." The Hon. Newton D. Baker will be a guest of the Alumni at the dinner.

Following the program of speeches, there will be a concert by the Boston Symphony Pops orchestra. The dinner is for Alumni and Alumnae only. Seats in the balconies of Symphony Hall may be obtained for women guests, at \$1.00 each, for the speaking and musical program following the dinner.

Program for the Ladies

A special effort is being made to provide for the wives of Technology Alumni an entertaining program throughout Alumni Day. There will be a bus trip to Concord and Lexington, beginning at 10:00 A.M. and arriving at 12 noon at the Wayside Inn at Sudbury for luncheon. Returning to the Institute by 3:00 P.M., the women may make a tour of inspection of the Institute with guides, watch the regatta on the Basin, and attend a tea to be given by Mrs. Compton and the Technology Matrons, probably in the Graduate House, at 4:00 P.M. At 5:00 P.M., busses will leave the Institute for the University Club where, at 6:45, dinner will be provided for the ladies. At 7:45, busses will take the women to Symphony Hall for the speeches and musical program.

Special Instructions

Other items on the program include the unveiling of a portrait of Dr. Harry W. Tyler, '84, and of a plaque commemorating the Rogers laboratory of physics. Special railway fares will be available on the identification certificate plan. Alumni are especially invited to the President's reception to graduates in Walker Memorial from 4:00 to 6:00 P.M. on the afternoon of June 9. *The price to alumni for the conference, lunch, and dinner on Alumni Day will be only \$5.00.*

CLASS REUNIONS SUMMARIZED

The "five-year" classes whose reunion plans had crystallized in time for this issue of *The Review* are as follows:

- 1891 — 45th Reunion, East Bay Lodge, Osterville, Mass., June 19, 20, and 21.
- 1896 — 40th Reunion, East Bay Lodge, Osterville, Mass., June 4, 5, 6, and 7.
- 1901 — 35th Reunion, Oyster Harbors, Mass., June 6 and 7.
- 1906 — 30th Reunion, Oyster Harbors Club, Osterville, Mass., June 6 and 7.
- 1911 — 25th Reunion, Mayflower Hotel, Manomet Point, Plymouth, Mass., June 5, 6, and 7.
- 1916 — 20th Reunion, Place still to be determined, June 5, 6, and 7.
- 1921 — 15th Reunion, Norwich Inn, near Norwich, Connecticut, June 5, 6, and 7.
- 1926 — 10th Reunion, Toy Town Tavern, Winchendon, Mass., June 6 and 7, meeting for luncheon at Walker Memorial at 12:30 on Saturday, June 6.

- 1931 — 5th Reunion, Mayflower Hotel, Plymouth, Mass., June 6 and 7, meeting at 1:30 on Sat. June 6, at Crafts Hall, M.I.T. Graduate House.

Although they will not be celebrating five-year milestones, the following classes are among those which have scheduled more or less informal get-togethers:

- 1900 — 36th Reunion. Stag affair tentatively planned for weekend of June 5 on Cape Cod.
- 1905 — 31st Reunion, Boxwood Manor, Old Lyme, Connecticut, June 5, 6, and 7.
- 1915 — 21st Reunion. Plan to gather with families at hotel near Symphony Hall early on the evening of Alumni Day, June 8.
- 1917 — 19th Reunion. Possible get-together on Long Island.
- 1935 — 1st Reunion. Members of this class will gather in west lounge of Walker Memorial at 9 A.M. on Alumni Day, June 8.

JOIN THE TREK BACK TO TECH!

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Change in Entrance Requirements

THE entrance requirements of the Institute have been revised and the new regulations, which permit greater flexibility in the choice of subjects and require fewer examinations, will become effective next autumn. The changes affect particularly those students who cannot qualify under the plan which permits students in the highest fifth of their class to enter Technology without examination. For this group the number of specific examination subjects has been reduced, the field of elective subjects enlarged, and language requirements liberalized.

These new requirements are related to the Institute's plan for stabilization of enrollment, under which the number of students admitted to the first-year class will be limited to approximately 600, consisting of those students whose personal and scholastic records give evidence that they are capable of gaining the greatest value from a scientific or engineering education.

Under the new entrance regulations, high- and preparatory-school students will be able to follow a more general program of preparation for their later work in science or engineering. In addition to a thorough preparation in English, which is considered a subject of fundamental importance, it is also necessary to be prepared soundly in physics and mathematics, on which much of the first year's work at Technology is based. The electives which may be offered include languages; social, biological, or physical sciences; mathematics, mechanic arts, mechanical drawing, commercial studies, fine arts, drama, or music.

Director of Admissions

THE appointment of Professor B. Alden Thresher, '20, to be Director of Admissions of the Institute was announced on April 5 and is one of several administrative and faculty changes taking place in the fall. Professor Thresher will succeed Dr. James L. Tryon, who retires this year after serving 16 years as a member of Technology's academic administration.

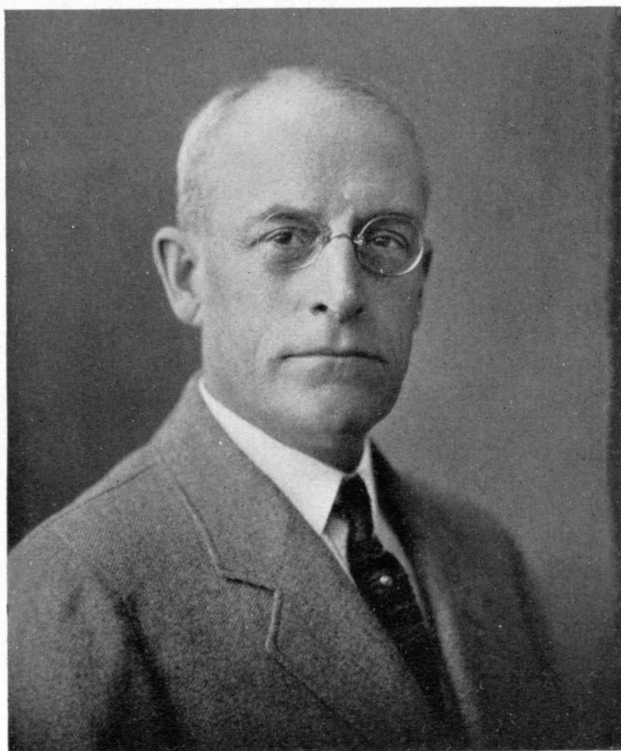
The Institute's new Director of Admissions has been a member of the Faculty of the Department of Economics and Social Science to which he came as an instructor in 1929, and his particular interests have been the economic and social aspects of technology and invention. Professor Thresher was born in Dayton, Ohio, in 1896, and received his preparatory education at the Hotchkiss School, later coming to the Institute from which he was graduated in 1920. In 1927 he entered the graduate school of Harvard University, which granted him the degree of master of arts the following year.

After serving as instructor at Technology for three years, Professor Thresher was appointed assistant professor, and last year was promoted to the rank of asso-

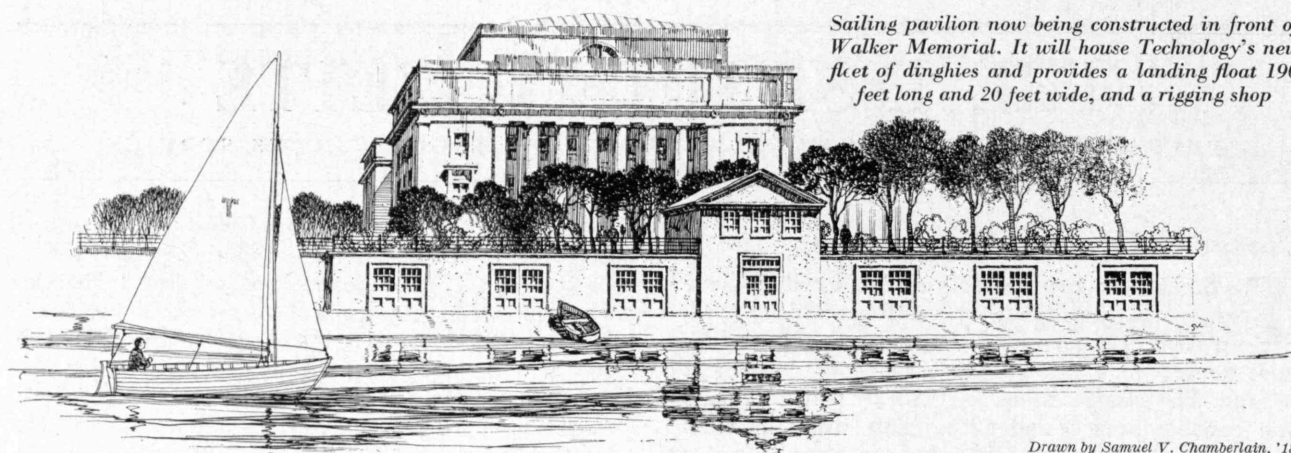
ciate professor. He is the author of various articles and book reviews in technical and economic journals, and is co-author of "The Economic Process" and "The Organization and Management of a Business Enterprise."

Professor Thresher is a member of Sigma Chi, the American Economic Association, the Society for the Promotion of Engineering Education, and the American Association of University Professors. In addition to his educational work, he has had considerable business and industrial experience. From 1920 to 1925, he was assistant plant engineer of the Eddystone Manufacturing Company, leaving that position to join the staff of the research division of the Dennison Manufacturing Company.

Dr. Tryon, the retiring Director of Admissions, is known to thousands of Technology students as a patient and understanding friend, as well as a kindly counselor advising them on entrance requirements and the choice of their professional courses. As a lecturer on vocational education, he has visited most of the colleges and preparatory schools of this country and Canada and is widely known among college officials. He has taken a particular interest in the welfare of foreign students at Technology and has been active in many ways to help



James L. Tryon, Director of Admissions, who retires this year. The Review speaks for thousands of Alumni who know Dr. Tryon in congratulating him on his 16 years of distinguished service to Technology and in expressing good wishes to his successor, Professor Thresher



Sailing pavilion now being constructed in front of Walker Memorial. It will house Technology's new fleet of dinghies and provides a landing float 190 feet long and 20 feet wide, and a rigging shop

Drawn by Samuel V. Chamberlain, '18

them adjust themselves to the American manner of living and the requirements of the American educational system.

Dr. Tryon, who retires with the title of Honorary Lecturer, joined the staff of the Institute in 1920, when he was appointed assistant registrar with the rank of assistant professor. He also served as assistant to the secretary of the Faculty in 1926-1927, and was appointed Director of Admissions in 1930. His promotion to the rank of professor and lecturer in vocational education came in 1930. He was graduated from Harvard University in 1894, and three years later received the degree of bachelor of divinity from the Episcopal Theological School. Later he studied law at Boston University, receiving his degree in that field in 1909, and his doctorate of philosophy the following year. He is widely known as an authority on international law, in which he has given courses at Maine and M.I.T.

Dr. Tryon is a member of the Appalachian Mountain Club and has twice been president of the Field and Forest Club of Boston.

Appointment

ALSO announced in April was the appointment of John M. Lessells, prominent consulting mechanical engineer, of Swarthmore, Pa., as Associate Professor in the Department of Mechanical Engineering at the Institute. He will be occupied with teaching and research in the field of engineering materials.

Mr. Lessells was born in Scotland and served a five-year engineering apprenticeship before being graduated from the University of Glasgow. During the War he was employed on inspection of engine parts and materials for Rolls-Royce, Armstrongs, and the British War Office. After the War, he joined the research staff of the Westinghouse Electric and Manufacturing Company at Pittsburgh, serving as manager of the applied mechanics division for eleven years. He later became engineering manager of the turbine and Diesel department of Westinghouse at Philadelphia, a position from which he resigned recently to enter practice as consulting engineer to Westinghouse and others. In partnership with Professor G. B. Karelitz he has been identified with some of the mechanical details of the 200-inch telescope to be erected on Mount Palomar, California.

Mr. Lessells is editor of the *Journal of Applied Mechanics* published by the American Society of Mechanical Engineers. Besides his activity as a member of this society, he is a member of the Iron and Steel Institute, the American Society for Testing Materials, and the Institution of Mechanical Engineers of Great Britain. The latter, in 1926, awarded him the Bernard Hall prize for a paper on fatigue and elastic limit.

At Technology, Mr. Lessells will offer courses in the materials of engineering, to which he brings a wide background of experience on both sides of the Atlantic.

Promotions and Retirements

PROMOTION of 18 members of the instructing staff to the rank of associate or assistant professor, and the retirement of five well-known members of the Faculty who have long been associated with the Institute, were among other important announcements made at Technology early in April.

Members of the Faculty who will retire this year are: Professor James R. Jack, Head of the Department of Naval Architecture; Professor George B. Haven, '94, Professor of Advanced Machine Design and in charge of textile research in the Department of Mechanical Engineering; Professor Leonard M. Passano and Professor Nathan R. George, both of the Department of Mathematics; Professor Carroll W. Doten, Professor of Political Economy. All will retire with the title of Professor Emeritus.

Staff members promoted to the rank of associate professor are: Jayson C. Balsbaugh, '24, Ernst A. Guillemin, '24, and Harold L. Hazen, '24, all of the Department of Electrical Engineering; Roy W. Carlson, Civil and Sanitary Engineering; Louis Harris, '20, of the Department of Chemistry.

Promotions to assistant professor were: Wilmer L. Barrow, '29, and John G. Trump, '33, of Electrical Engineering; Albert A. Lawrence, Theodore Smith, and, Robert S. Woodbury, '28, of the Department of English and History; Edward M. Bridge, '13, and J. Talmage Woodruff, '17, of the Department of Architecture; Alexander J. Bone, '24, of the Department of Civil and Sanitary Engineering; Samuel C. Collins, Department of Chemistry; Edwin R. Gilliland, '33, Department of Chemical Engineering; Prescott D. Crout, '29, Depart-

ment of Mathematics; Alvin Sloane, Department of Mechanical Engineering; Edward S. Lamar, Department of Physics.

Professor Jack, retiring Head of the Department of Naval Architecture, joined the staff of the Institute in 1919, when he gave a series of lectures on naval architecture. The following year he was asked to take charge of the department, and in 1923 he assumed the additional duties of Dean of Navy Students. He is a native of Scotland and studied at the University of Glasgow before entering the great shipbuilding firm of William Denny and Brothers, Ltd., at Dumbarton, where during a long and distinguished career he designed more than 350 ships of various types. Upon retirement Professor Jack will become an Honorary Lecturer in the department of which he has been in charge for 16 years.

Professor Haven, who was born in Sangerfield, New York, is a graduate of the Institute with the Class of 1894, and joined the teaching staff in 1896. He is widely known as an authority on machine design and textile machinery as well as methods of research. His contributions to technical literature include several books and many articles. He is a member of the United States Institute for Textile Research, Inc., and for his contributions in the field of textile research he was awarded a medal by the National Association of Cotton Manufacturers in 1931.

Professor Passano, a member of the Department of Mathematics since 1892, was born in Baltimore, Md. From 1886 until 1892, he attended Johns Hopkins University, where he majored in economics, mathematics, and English literature. In addition to his teaching, he has contributed widely to both professional and literary publications.

Professor George is a native of Mendon, Mass., and was graduated from Harvard University in 1890. He joined the Institute's Department of Mathematics 45 years ago and has been Professor of Mathematics since 1913.

A native of Pantton, Vt., and a graduate and former secretary and registrar of the University of Vermont, Professor Doten joined the staff of Technology 33 years ago. After his graduation from the University of Vermont in 1895, he continued his studies at Harvard University, being graduated in 1902. He retires as Professor Emeritus of Political Economy.

Professor John C. Slater, Head of the Department of Physics, has been granted leave of absence for the second term of the next academic year, while Professor Nathaniel H. Frank, '23, also of the Department of Physics, will be on leave of absence during the first term.

Physics for Industry

A NEW group of courses in applied physics designed to meet the growing demand for scientists with special training for the application of physics in the solution of industrial problems was announced recently by Professor John C. Slater, Head of the Department of Physics. Professor George R. Harrison, Director of the Research Laboratory of Experimental Physics, has been appointed Director of Applied Physics and will be in charge of the courses, which will begin next autumn.

President Compton, who as chairman of the national Science Advisory Board studied the possibilities of applying the knowledge and discoveries of science in industry, is also chairman of the American Institute of Physics, which after a study of several years has suggested the type of training which will be most valuable for physicists who expect to enter the research, development, or engineering branches of industrial organizations. In this study the requirements of a large number of industries were considered, with the result that a permanent national council on applied physics was established. While physics has already played an important part in recent advances in many fields, it is destined to have a still more significant rôle in the future.

Training in applied physics is expected to be especially valuable in the electrical, optical, chemical, textile, paper, printing ink, aircraft, and automobile industries, as well as in oil production and refining, geology and geophysics, acoustics and metallurgy.

Physical principles, for example, will enter into the development of economical railway trains, prefabricated houses, air conditioning, the preservation of food, the processing of plastics, which include glass, rubber, paint and composition moulding materials, color photography, television, and many others.

Students in the new courses will devote more time to chemistry, metallurgy, and the fundamentals of electrical and mechanical engineering. The new program supplements rather than competes with the long-established course in pure physics, which goes farther into the speculative aspects of science. Thus there will be no sharp distinction of staff, subjects, or students between the two fields of study, for under the new plan students will be able to follow their inclinations and aptitudes in one direction or the other through proper selection of their elective courses.

The facilities of the courses will include the Eastman Laboratories of Physics and Chemistry and the Institute's Spectroscopy Laboratory.



Courtesy Boston Post

Walter C. Wood, '17, and President Compton sailing one of the new Technology dinghies in the Charles River Basin. Mr. Wood has been appointed sailing master of the student's Nautical Association

Abroad

PROFESSOR Walter G. Whitman, '17, Head of the Department of Chemical Engineering, will be the official representative of the Institute at the centenary celebration of the founding of the University of London, which will be held in London, June 28 to July 3.

While in England, Professor Whitman will also attend the joint meetings of the American Institute of Chemical Engineers and the British Institution of Chemical Engineers, as well as the Chemical Engineering Congress of the World Power Conference, which meets in London from June 22 to June 27. Among the papers to be presented to the Congress will be one on "Heat Transmission," of which T. B. Drew, '23, and Professors H. C. Hottel, '24, and W. H. McAdams, '17, of the Department of Chemical Engineering are the authors.

Changes in Curriculums

REVISION of the Institute's curriculums, including simplification of courses and improvement in methods of presentation in the Departments of Science and Engineering, has been announced by Professor

Charles E. Fuller, '92, Chairman of the Faculty. The changes, which become effective next autumn, were adopted after an exhaustive study of several years by faculty members. The new plan provides for unification of subject matter and closer contact between members of the Faculty and students.

Under the revision the Faculty has adhered to the plan, inaugurated by the Institute in its early days, to offer its students a wide choice of courses in the various branches of pure and applied science and engineering. It is considered important that students have the opportunity to choose a course that stimulates their interests and provides an incentive for active and vigorous effort. Under a purely elective system, however, very few undergraduates have sufficient background or experience to enable them to choose a curriculum in any given field with a proper sequence and coordination of studies. This problem has been met by arranging courses in a comparatively large number of fields and, in several of these, providing further differentiation by allowing a choice of several options.

The arrangement of the revised curriculums is such that, except in the Department of Architecture, the course of studies for the first year, which includes mathematics, physics, English, and history, is the same for all students. With this exception, a student is not therefore required to elect his professional course until the end of the freshman year.

The curriculums for the sophomore year for all departments carries forward the same fundamental courses undertaken in the first year, but they are differentiated by the inclusion of one or two introductory professional studies to broaden the groundwork for the courses that follow in the upper years. The greatest difference is between the curriculums in the departments which require an extension of the fundamental course in chemistry throughout the sophomore year and the departments in which little if any chemistry is required beyond the freshman year.

Within either of the foregoing groups the differences in the second year curriculums are relatively small. If a student feels at the end of the freshman year that he did not make the most satisfactory choice of a course, he may, at the end of the sophomore year, change from one course to another within his elected group. This change may be accomplished by taking during the summer between the sophomore and junior years the introductory work he has missed. Thus the choice of the course elected by a student is not necessarily final until the end of the sophomore year.



Sunlight and shadows in the main lobby of the Institute

In the junior and senior years stress has again been laid on fundamentals. The objective in the selection of studies in the curriculum of each branch of engineering and science is to provide a thorough training in basic principles with a limited specialization in any field.

In meeting this objective the branches of study to be undertaken at any one time have been limited to a number small enough to enable him to devote the time required to acquire a thorough training in each branch and to avoid the superficiality which results from too wide a spread of effort.

Under the revision students will devote more time to study and less to formal class work, a change which is expected to encourage thoughtful consideration of problems under conditions which in some degree approximate those encountered in professional work. More time has been allotted to conferences between students and members of the teaching staff, for the personal contacts established by consideration and discussion of current matters in engineering and scientific research are considered a very valuable factor in a student's education. It is hoped that greater individual responsibility and closer relationships with the Faculty will materially help students to meet the problems of adjustment that often occur in the transition from college to professional work.

A definite portion of the curriculum for each department has been allocated to nonprofessional studies, partially elective, in the fields of English and history, economics and social science, philosophy, literature, language, and the fine arts. The object of this is to broaden the student's education beyond the limits of the professional field he elects, give him a better preparation for properly meeting his obligations in whatever business and social environment he may be placed.

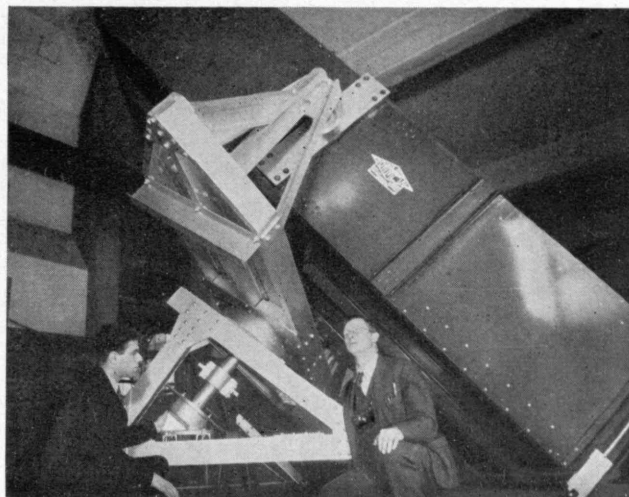
Studies in the freshman and sophomore years include basic courses in military science. In the junior and senior years advanced R.O.T.C. optional courses are offered to students who are citizens of the United States.

Throughout the Institute the aim is to develop good mental habits and correct methods of study, broad mental power, good judgment, and the initiative and ability to work out on individual responsibility the solution of the problems which the student may meet in the practice of his profession.

Medals

TWO members of the Institute's Faculty, Dr. Waldemar Lindgren, Professor Emeritus of Geology and former Head of that Department, and Dr. Alfred V. deForest, '11, Associate Professor of Mechanical Engineering, have recently been awarded medals in recognition of their achievements in the field of science.

Dr. Lindgren has received the *Médaille Gustave Trésenster* given by the association of alumni engineers of the Université de Liège, Belgium, which has previously honored only four other scientists in this manner. In announcing the award to Dr. Lindgren the *Revue Universelle des Mines*, an alumni publication of the Université, pointed out that their aim this year was to honor a man particularly distinguished in economic geography, which has been Dr. Lindgren's chosen field. The medal was officially accepted by Hon. Dave H.



This giant camera, one of the largest spectrographs ever built, is to be used by the Harvard-M.I.T. eclipse expedition to observe the total solar eclipse in Russia on June 19. Made of Dow-metal, the spectrograph box, which is 12 feet long, three feet wide, and five feet deep, with its mountings weighs less than half a ton.

Inside the spectrograph will be housed four plane gratings, polished metal surfaces ruled with 15,000 lines to the inch, which will be used, each with a lens and camera, to photograph the crescent of the eclipsed sun and the corona in lights of different wavelengths, ranging all the way from ultraviolet to the infra-red.

Built by the Dow Chemical Company, the big spectroscope has just been set up for final testing at the Institute before shipping to Russia. Left to right, Henry Hemmendinger and Dr. Donald H. Menzel, director of the expedition, both of Harvard Observatory

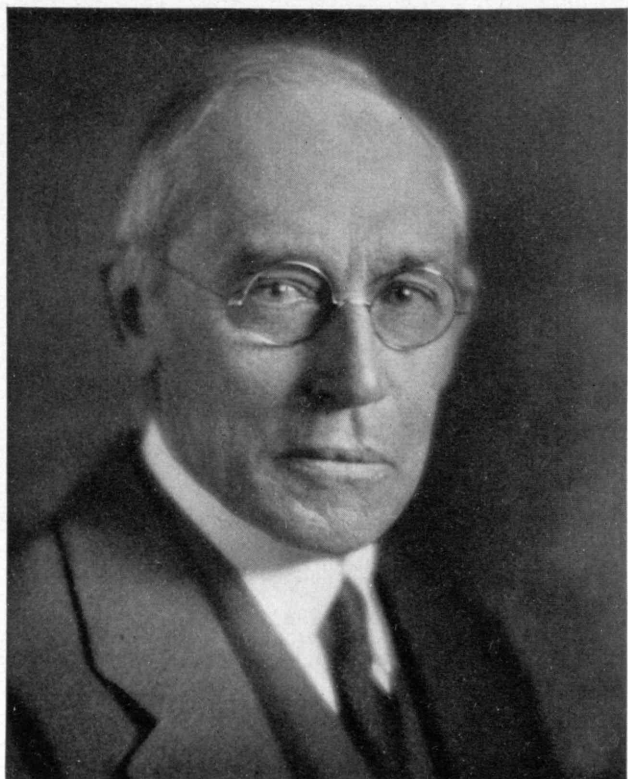
Morris, American Ambassador to Belgium, for Dr. Lindgren, and has been transmitted to him through diplomatic channels.

Dr. deForest has been awarded and will receive, this month, the Edward Longstreth Medal of the Franklin Institute, for his achievements in metallurgical research. Recommendation for the honor is made by the Institute's committee on Science and the Arts and it goes to Dr. deForest for his work on the accurate testing of finished products without injury to them. The medal is awarded annually for "inventions or for meritorious improvements in machines and mechanical processes."

Albert Farwell Bemis, '93 (1870-1936)

THE Review records with sorrow the death of Albert Farwell Bemis, '93, on April 11 as a result of complications arising from an apparently not serious fall he suffered while taking pictures of the Grand Canyon, the preceding Saturday.

Mr. Bemis was one of Technology's most loyal and distinguished Alumni. A Life Member of the Corporation, he served on many committees in various capacities relating to nearly all phases of Institute life. Only last June he became one of the 24 founder members of the Research Associates of M.I.T., a group of leaders and organizers of American industry who contribute to the support of research at the Institute. He was elected President of the Alumni Association in 1910 and during his term of office was responsible for many beneficial changes in the Association including the system of election by Alumni of Term Members to the Institute



Albert Farwell Bemis, '93, Life Member of the Corporation, generous friend of the Institute; who died on April 11 as the result of an accidental fall at Grand Canyon (see below)

Corporation. At various times he has been a member of Visiting Committees to a number of Institute departments, notably Civil Engineering, Architecture, Naval Architecture, and the Division of Industrial Coöperation. He played an important part in the development of Technology's dormitory system and contributed substantially toward the cost of the Class of 1893 dormitory. He was always interested in Technology's younger men and was responsible for placing many graduates in positions from which they later rose to prominence. His influence and help at Technology will be sorely missed.

The major portion of his business career was spent with Bemis Bro. Bag Company of which he was president from 1909 to 1925 and chairman from 1925 until his retirement from this activity in 1934; he was a founder of the Angus Company, Ltd., operating a jute mill and jute machinery works in India, a country in which he was always greatly interested; he had been a director of several other textile companies, notably Boott Mills of Lowell, Mass., from 1905 to 1934; also a director of the Second National Bank of Boston from 1916 to 1926 and of the Federal Reserve Bank of Boston from 1928 to 1932. Other business interests, coupled with a life-long interest in research and economics, made him a member of the Executive Committee of the National Industrial Conference Board from 1928 to 1932 and again from 1934 until his death, during which he was also chairman of the Advisory Council on Research.

Mr. Bemis always maintained a lively interest, almost a dominating interest, in architecture and building. In addition to the Technology dormitory construction, he

made possible, almost single-handed, the rebuilding of the great tower of Lincoln Cathedral, England, both by his large financial contributions and by his close coöperation with Lincoln's great rebuilder, Dean Fry; with the Duke and Duchess of York he was a guest of honor at the rededication and thanksgiving services in Lincoln in 1932. This interest in building made him the founder of the Housing Company in 1918, an institution which built many of the finest group housing developments in New England and elsewhere, notably those at Bridgeport and Nashua; he was an active and constant supporter of housing research, both economic and physical, with a view to the production of better housing for the lower-income groups; in the field of housing he became a nationally known authority. The latest results of this work are a three-volume book, published by The Technology Press, under the general title of "The Evolving House," the last volume of which he had completed just prior to his death.

In addition to these major interests, Mr. Bemis retained to the end a deep concern in all sorts of human activities: He was an eager traveler and had visited most of the nations of the world; he did his utmost to promote better Anglo-American relations and held a life governorship in the English Speaking Union of London and was a life member of the Royal Society of Arts, also of London; nearly as many friends will mourn his death in England as in his own land. The Orient interested him, too, particularly India and the oriental side of Russia, and he wrote many papers about these lands. In India his company did much to improve the conditions of the natives, notably from the point of view of health and sanitation. Study of economics led him also to write many forceful papers for such organizations as the American Academy of Political and Social Science.

Technology Alumni and the Technology community will long remember not only Mr. Bemis' manifold and successful career in widely varying fields and his unstinted generosity in many directions, but more importantly his kindness, his humanity and sympathy, and his love for and help to the young.

Coöordinator

PROFESSOR J. W. M. Bunker has been appointed Director of the Research Laboratories of Biology, a field in which he has long been active in the Department of Biology and Public Health. The research program now going forward under Dr. Bunker's supervision includes his own work and that of Dr. Robert S. Harris, '28, in the field of experimental rickets, as well as investigation by Dr. Murray P. Horwood, '16, of the sanitary significance of certain bacteria in water, milk, and other foods, studies of the microbiology of the upper air by Dr. Bernard E. Proctor, '23 and the growth of bacteria by Dr. Marshall W. Jennison, '27. Dr. J. W. Williams is investigating the control of fungus diseases in man, while Dr. Cecil G. Dunn, '30, is making an evaluation of chemical compounds as germicidal and fungicidal agents. Dr. Bryce Prindle, '31, a Research Fellow, is investigating the biochemical effects of bacteria and molds on wool and cotton in relation to damage and fiber structure.

Council Meetings

ON the date that this issue of The Review is scheduled to go into the mails the Alumni Council holds an open meeting at which the speaker will be James B. Conant, President of Harvard University, and the guests the presidents of Boston College, Boston University, Northeastern, Simmons, and Tufts.

At the preceding, or 186th meeting of the Council, on March 30, 81 members and guests gathered in Walker Memorial to transact business and to hear Dean A. Fales, '14, Associate Professor in the Department of Mechanical Engineering, speak on "Can Safe Automobiles Be Built?" The gist of Professor Fales' talk appeared as a formal article in the April issue of The Review (page 276).

The Secretary at this meeting reported that alumni dues collections totaled 6,099, which is 295, or five per cent, more than the final total a year ago and 544, or ten per cent, more than the final total two years ago.



Robert F. Elder, Associate Professor of Marketing, and Louis F. Woodruff, '18, Associate Professor of Electrical Engineering, with the instrument, developed by the latter, for automatically recording the preferences of radio audiences. The device, attached to a radio, shows the hour when a radio is turned on or off, the station tuned in, and any change made in stations

Introduction

The research described in the following pages claims to be nothing more than a beginning in an extended series of solar investigations which I hope soon to continue.

No branch of physics seems to me to offer richer returns to the patient investigator than that dealing with the constitution of the Sun.

Although the work has been in progress for more than twenty years questions of every degree of complexity yet remain to be answered.

We are still compelled to wait for the rare and fleeting visits of the lunar shadow to show

On April 7 scientists met at Harvard to honor George Ellery Hale, '90, director emeritus and originator of Mount Wilson Observatory, inventor of the spectroheliograph, founder of the California Institute of Technology, one of America's greatest astronomers.

Above is a facsimile of the introductory page to Dr. Hale's thesis submitted to the Institute's Faculty in 1890 in accordance with the requirements for the degree of Bachelor of Science in physics. Included in this thesis was his original design of the spectroheliograph.

At the symposium in recognition of Dr. Hale's great contribution to science, Harry M. Goodwin, '90, Dean of Technology's Graduate School and classmate of Dr. Hale spoke, as did Robert B. King of the Physics Department

The President spoke of the death of Frank A. Bourne, '96, council representative for Chile, which occurred on February 15, and it was announced that the Executive Committee had elected John E. Burchard, 2d, '23, as his successor. Gilbert M. Roddy, '31, had been elected class representative on the Council and Edward L. Moreland, '07, council representative for the new Knoxville club. Since the constitution of the Association prohibits the recognition of a local club within the 25-mile radius of Boston, the Executive Committee had decided that such clubs as might be organized within that radius could be designated as associate clubs without any council representation except that they would be privileged to send one of their number as a guest member to the Council without the privilege of voting.

The Alumni Council unanimously passed the following vote: "that it concurred in the action of the Executive Committee to the Institute Corporation in allocating the William Barton Rogers fund to scholarships rather than to student loans, the particular place in the Institute's scholarship funds to be determined by the President and Treasurer of the Institute, as well as the terms covering scholarship grants from the fund."

Changes in Naval Architecture

PROFESSOR Henry H. W. Keith, '05, long a member of the Institute's Faculty, has been appointed acting head of the Department of Naval Architecture and Marine Engineering. He will take over the duties of Professor James R. Jack, whose retirement is announced elsewhere. In the autumn the department will welcome to its staff Frank M. Lewis, of the faculty of the Webb Institute of Naval Architecture, whose appointment to Technology has just been announced.

Professor Keith after graduation carried on important research work in the United States experimental model basin at the Navy Yard in Washington. He joined the staff of M.I.T. in 1910, continuing his academic work until 1917 when he enrolled in the United States Naval Reserve and was attached to the Boston Navy Yard as

materials officer, naval architect, and design superintendent with the rank of lieutenant commander. Detached from active duty in 1920, Professor Keith returned to his work at the Institute and in 1928 was promoted to the rank of professor of naval architecture. He is widely known as a consulting engineer, and as an authority on the launching of ships. In this field he has been associated with the launching of most of the large vessels at the Fore River plant of the Bethlehem Shipbuilding Corporation in recent years. He is a member of the Society of Naval Architects and Marine Engineers, and the Society of Naval Engineers.

Professor Lewis is well known among naval engineers as an authority on problems of vibration in ships and marine power plants, a field in which he has carried on important investigations. He graduated from the Webb Institute in 1917.

THE STORY BEHIND YOUR LIGHT BILL

(Continued from page 345)

mental operation is complete without reference to the relative cost levels that have heretofore existed under private and municipal operation. In general it may be stated that the same basic factors control costs regardless of the form of the operating control. However, efficiency of operation will have very marked effects upon the magnitude of cost components entering into the various price structures. A thorough analysis of the most recently available statistics indicates higher overall costs, all factors considered, to the customers of the 1,800 to 1,900 municipal electric systems than would have been paid had these municipal systems been consolidated with the privately operated systems.

In the comparison presented in the following paragraphs consideration has been given to all relevant factors, such as differences in utilization characteristics, known peculiarities in reporting sales and revenues, and to the very important factor of the tax differentials existing between private and municipal operations.

The most recently available data separately covering municipal and private operations are those compiled by the United States Census Bureau, in the Census of Electrical Industries for the year 1932. Unfortunately this census is not taken annually, thus the data presented is approximately three years old. Relatively, however, there will have been little change during the past several years.

Comparisons of group average prices are worthless unless accompanied by explanatory data to make possible adjustments for the several variables that control average rate levels. Thus, the "raw" statistics developed by the census indicated a combined average price of 2.7 cents per kilowatt hour for all energy sold by privately operated electric systems; the average for municipal systems was 3.1 cents per kilowatt hour. Such comparisons are valueless when it is realized that approximately 50% of all private utility sales were to customers of the industrial power group at an average price of 1.5 cents per kilowatt hour; the municipal systems had less than

15% of their sales in this particular classification. If total sales for the year 1932 are allocated to the major customer classifications the following comparative values will be found:

	Domestic		Small Lt. & Pwr.		Large Lt. & Pwr.	
	Kwh. per Customer	Cents per Kwh.	Kwh. per Customer	Cents per Kwh.	Kwh. per Customer	Cents per Kwh.
Private Systems	600	5.6	3,288	4.3	87,474	1.5
Municipal Systems . .	708	4.7	5,199	2.6	31,249	1.7
Total	611	5.5	3,418	4.1	85,345	1.5

If no consideration is given to modifying factors, these values would indicate a considerable differential in favor of municipal rate levels for both the domestic and the small commercial classifications. Such a comparison is, however, unsound because it fails to take cognizance of the important variable of average use per customer and its effect upon average rate level. Due to the characteristics of the generally accepted rate forms, it is inherent that relatively lower average prices accompany higher average utilization values. This factor accounts for major portions of the differentials disclosed above.

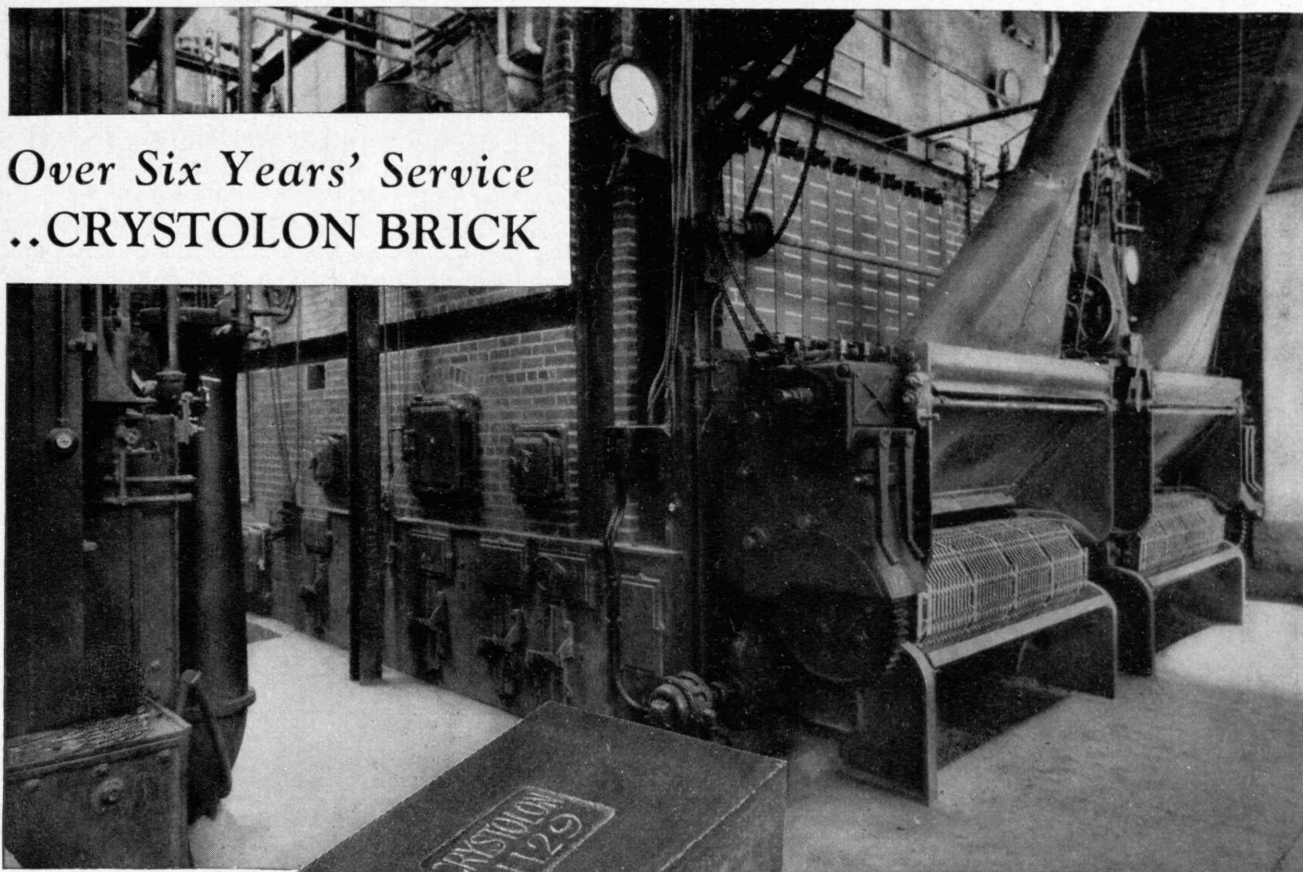
Using the fact that variations in average use are accompanied by proportionate variations in average price it is possible to prepare the family of curves presented on Chart V. These curves show the relationships existing between average annual use and average price for both private and municipal operations. Values for each of the nine geographic divisions were used as a basis.

A comparison of the rate levels indicates generally lower domestic rates on the private systems than on the municipal systems; the opposite relationship exists in the small commercial category. The average differential in this latter group is, however, approximately equivalent to the average tax differential existing between the two methods of operation. In the large light and power category, the relative levels are difficult to determine due to the wide dispersion of individual values. For this analysis, the two trend lines may be considered to coincide. From the graphical relationships here developed it is possible to obtain the average and approximate total revenue differentials between municipal and private operations under any specific condition of consumption.

However, before a true comparison can be made, it is necessary to give consideration to the fact that municipal utility operations are tax exempt. During the year under consideration (1932) the over-all tax burden of the electric utility industry was \$217,000,000, or approximately 11.8% of total revenues. Taxes paid by municipal operations were between one and two per cent of total revenues, leaving a differential of about 10%.

A municipality, when considering the adoption of municipal operation, fails to consider the possible repercussions of the tax-exemption privileges. While, in the individual case, the loss of tax revenue may be insignificant the combined effect of a number of such situations ultimately results in an inequitable shift of tax burdens to the citizens of other municipalities, to say nothing of possible increases in the tax bill (Continued on page 364)

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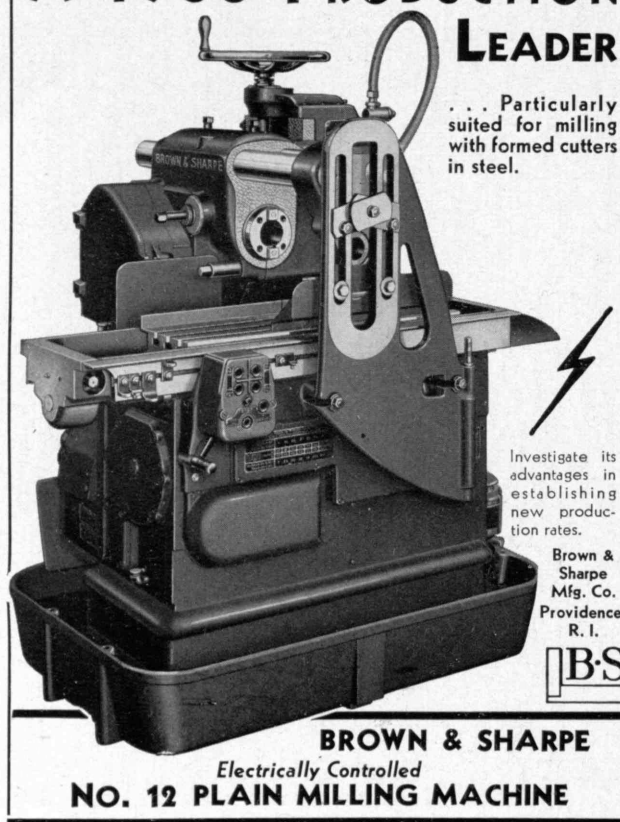
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SCIENCE AND THE FINE ARTS

(Continued from page 341)

author of several modern novels which have attracted wide attention. Alfred Parker Morell, IV-A, '28, is the author of "Diamond Jim Brady" which was listed among the best sellers in biography in 1935.

These contributions of our Alumni to the fine arts are samples. It would be impossible to include all Alumni with an artistic temperament in the limited space of this article. The case as stated should be sufficient to prove that technical education does not suppress esthetic values. There is no reason to assume that in the future, as well as in the past, our graduates will not continue to create things of beauty whether they have a useful purpose or not.

We may now consider to what degree workers in science have coöperated in the development of the fine arts. The architect without question leans heavily upon the engineer. An architectural vision which cannot be raised into the air and stand firm must remain a picture of what might have been if scientists had been willing to help. The engineer has introduced tension to the structure; otherwise Broadway might have been crisscrossed with flying buttresses. Scientific research has developed new structural materials, new methods of fabrication, and more rapid and cheaper methods of construction. The skyscraper without the electric elevator would never have been built.

Most of the statuary and ornamentation of stone and wood is now carved by machinery in reproduction of a model and the casting of statuary in plaster or metal is an exacting technical process. The synthesis of new plastics, such as that obtained from carbolic acid and formaldehyde, has given the sculptor a new medium with which to mold the smaller statues and bas-reliefs. The Institute offers a course in ceramics which is dedicated in part to the scientific composition and construction of ornamental objects.

The excellence and permanence of a painting depends inherently upon the quality of the pigments and the foundation material. The soluble media used by the old masters often consisted of eggs, milk, honey, fish glue, or wine. During one early period of painting, all portraits were made with red lead, with obvious monotony. The Latin word for red lead is (Continued on page 358)



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SCIENCE AND THE FINE ARTS

(Continued from page 356)

minium and is the etymological origin of the present day miniature. In other words it had originally nothing to do with its minute size. Modern chemistry has given the painter standardized and more durable oils and varnishes.

Another direct influence of science upon painting is indicated by the increasing use of mathematical principles in the composition and design of a picture. The use of the principles of perspective is well known. In the middle of the Nineteenth Century Zeising, and later Fechner, developed the principle of the "golden section ratio." The theory has recently been given further impetus by the work of Churchill and Conrow. Art literature of today, in consequence, contains frequent reference to such terms as "mathematical analysis," "biometric pattern," and "pentagonal symmetry." The meaning of the golden section ratio may be explained by taking as an example the simple figure known as the cross, the symbol of the Christian religion. Where should the horizontal line intersect the vertical line to make the most pleasing cross? According to the golden section ratio it should intersect the vertical line at a distance from the bottom equal to $21/34$ ths of its height. Incidentally, a calling card having rectangular dimensions of the same proportion will be selected by most people as the best and the most pleasing in form. The ratio with its integral multiples in either numerator or denominator may also be shown to apply to the proportions of the perfect human figure.

At the turn of the century the prescription of most schools of art was: "Paint what you see." The camera sees so much better and, with the aid of distorting lenses and color filters, has produced such pleasing effects as to change the prescription of the painter of modern art to: "Don't paint what you see." Something had to be done by the painter to protect his calling and he may still be somewhat apprehensive as to the future. It is not improbable that we shall some day have a machine which will paint with brushes and pigments a picture of any object or scene within the range of its lens. If a "genuine" oil painting is desired, distorting lenses can produce any desired effect so that it can still be said that "a portrait is a picture of a man with something wrong with the mouth."

The introduction of action in the motion picture is another important contribution of science to the delineation of human interests. *(Continued on page 360)*

270,000 Telephone Workers

There are 270,000 workers in the Bell System. It takes a telephone system of great size to render quick, reliable service to a great nation.

Bell Telephone System





Facsimile of front page of The Davenport Democrat

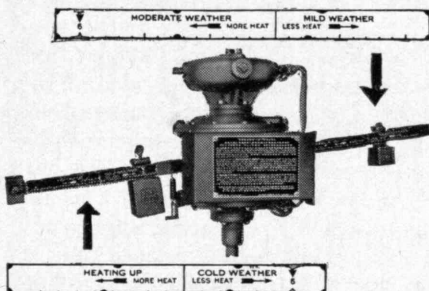
IOWA NEWSPAPER CUTS HEATING COSTS \$517

Davenport Democrat Uses Webster Hylo System to Improve Heat Distribution, Lower Cost

Davenport, Ia.—The Democrat Building, home of the Democrat Publishing Company, publishers of the Davenport Democrat for more than 80 years, reduced the cost of heating during 1934-35 a total of \$517, as the result of a Webster Heating Modernization Program which converted the installation into a Webster Hylo System of Steam Heating.

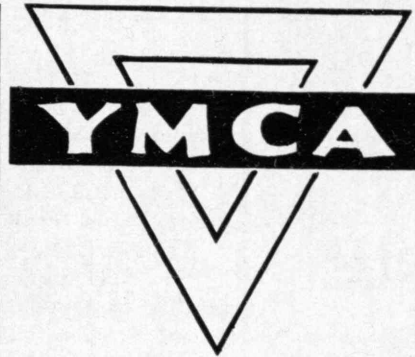
The modernization included necessary changes in piping to fit the installation to newspaper requirements, installation of radiator traps and accurately sized metering orifices in each of the 74 radiators and application of a central Webster Hylo Steam Variator Control.

The saving of \$517 represents a 27 per cent reduction in cash expenditure for heating. At this rate, modernization will repay its entire cost in less than three years.



Webster Hylo Steam Variator—a simple, rugged central control for use with Webster Systems where distribution of steam to all radiators is balanced by accurately sized metering orifices. The Hylo Variator Valve Operator (illustrated) automatically throttles a rugged motor-operated valve in the steam main.

Webster engineers cooperated closely with the owners and the heating contractors, the Ryan Plumbing and Heating Company, in meeting publishing requirements. The press room is kept at 80 degrees constantly. Savings are achieved without adverse effect on production.



Triangular insignia of the Young Men's Christian Association, representing "Spirit, Mind and Body."

THREE YMCA BUILDINGS REDUCE HEATING COSTS

Webster Heating Modernization Cuts Fuel Bills Without Impairing Heating Comfort

CINCINNATI "Y" SAVES \$1,486

Cincinnati, O.—Three large Young Men's Christian Association buildings report sharp reductions in heating expense as the result of Webster Heating Modernization Programs completed within the last few years.

In downtown Cincinnati, the Association building saved 357 tons of coal within two years after the new heating system was installed. This is a cash saving of \$1,486.

In neighboring Columbus, and in Minneapolis, Y. M. C. A. Buildings have achieved similar heating economies, without sacrificing heating comfort, by installing the Webster Moderator System of Steam Heating.

During the first two years in the Columbus "Y," the Webster Moderator System reduced coal consumption 395 tons. This is a cash saving of \$1,294. Savings in this case, as at Cincinnati, are based on the difference between current coal bills and past average coal bills over a two or three-year period.

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In a typical month before modernization, the Phoenix Building required 559,800 lbs. of steam. With the Webster Moderator System, after correction for degree day differences, the building saved 194,000 lbs. of steam—a cash reduction of \$172 for a single month.

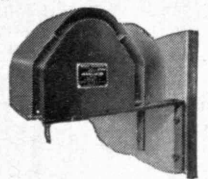
The heating modernization program is not solely responsible for these savings, but the owners credit the Webster Moderator System with a "very considerable portion of the reduction." Other factors include the lowering and insulation of ceilings on the second floor and a slight reduction in floor area.

In addition to the remarkable fuel savings, heating service is greatly improved. The new system is able to meet every heating need of a variety of tenants, by careful control of steam circulation.

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SCIENCE AND THE FINE ARTS

(Continued from page 358)

Starting with black and white it now embraces projection in color. Stereoscopic motion pictures are in the offing. It should be mentioned here that in its present form the motion picture in color was developed largely by Daniel Frost Comstock, VIII, '04, and Herbert Thomas Kalmus, VIII, '04. With reference to certain types of motion picture, the effect of their educational value in stimulating public interest in the fine arts cannot be overestimated.

The quality of musical sensations depends to a large degree upon the nature of the source and the acoustic properties of the space in which the sound is produced. A string of sheep gut stretched over a resonant box and stroked with the taut hair of a horse's tail is called a violin, but the quality of its tone depends markedly upon many details of scientific construction. In spite of all the homage paid to Stradivarius, progress is still being made in the production of a finer violin. Laboratory workers who have manipulated a Wheatstone's bridge may not know that his other great invention was the accordion. Those who rebel against the machine age should stop going to organ recitals: Behind the shutters of the tone orifice they will find perhaps the greatest assemblage of mechanical, electrical, and acoustical apparatus that man has ever brought together.

Out of a host of conflicting opinions regarding the treatment of interiors for the best sound effects, the decibel meter with scientific precision has indicated the proper arrangement. For the greatest enjoyment of music the reverberation constant, or the time of subsidence to inaudibility, should neither be zero nor too long. The music is more pleasing if the sound waves overlap somewhat at the listener's ear. In Symphony Hall at Boston the average reverberation constant is slightly less than two seconds, which is considered to be ideal for symphonic music. Broadcasting studios have been designed and surfaced with sound-absorbing materials and finally checked with regard to this principle by a decibel meter. For every person who listens to music today in a hall there are thousands who listen indirectly by radio. The fine art of classical music is thus brought into nearly every home in the land and the fidelity of its reproduction is one of the great triumphs of modern science. The motion picture accompanied by sound has been given added life and interest. This also will eventually be projected into the home by means of television. The phonograph by constant application of the fundamental sciences has been developed to such a state of perfection that it is often difficult to distinguish the direct sound of the musical instrument from its reproduction.

It has been proposed for many years to develop a new source of musical sound which will make it possible to duplicate the tonal quality of any existing instrument and add unlimited new sensations in tone which have never been heard before. These electrical instruments are just coming into production and it is safe to predict that the art of music, by this influence, will be broadened if not revolutionized. The art of musical composition must be given further (Concluded on page 362)

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The Institute publishes a variety of bulletins, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

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SCIENCE AND THE FINE ARTS

(Concluded from page 360)

consideration, and a new type of artist must be developed to bring out the most pleasing tones of the instrument.

In the same manner that some of the charm of an oriental rug is said to be associated with its imperfections and divergence from machine-made patterns, the brilliance of a virtuoso is ascribed in part to his eccentricity and individuality of expression. Fear is often expressed that the new synthetic instruments will possess none of these properties. It must be remembered that a piano contains considerable machinery and consists of a harp sounded by hammers, levers, and keys. The new sound instruments will rather encourage greater individuality of expression, feeling, and technique, because they offer greater facility for the production of such characteristics.

What may be said as to the coöperation between science and poetry? Coleridge regarded science as the antithesis of poetry. Emily Dickinson evidently regarded science as a nuisance when she wrote:

"Arcturus is his other name,
I'd rather call him star!
It's so unkind of science
To go and interfere!"

But there seems to be some confusion among the poets. Anonymous, the greatest poet of them all, beseeches us with:

"Twinkle, twinkle, little star!
How I wonder what you are."

So it could be argued that science is not the antithesis but may be either a stimulus or an answer to poetry. When the poets begin to understand such things, may we not expect, in rhyme and rhythm, word pictures of the expanding universe, the flight of the photon, the intertwining of the chromosomes, and the roar of heavy waters. Quoting Emily Dickinson again:

"The skies can't keep their secret!
They tell it to the hills —
The hills just tell the orchards —
And they, the daffodils!"

Having found out very little about the skies from the daffodils the scientist may prefer to say:

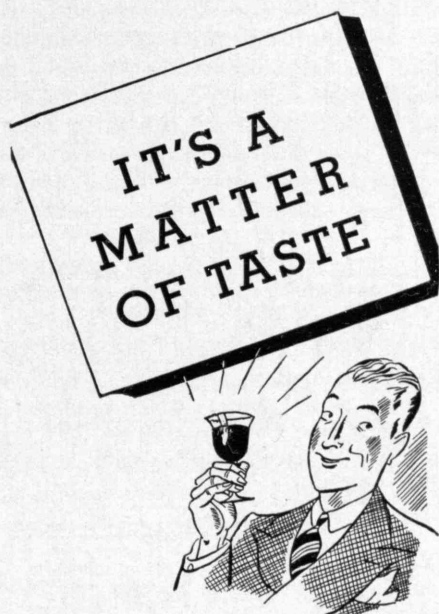
"The skies can't keep their secret!
They tell it to hill and dale —
Mount Wilson tells the spectroscope —
And she tells George Ellery Hale." *

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THE STORY BEHIND YOUR LIGHT BILL

(Continued from page 354)

of the community adopting municipal utility operations. The effect of Federal grants for the construction of utility facilities merely emphasizes this situation, particularly if the condition of the nation as a whole is considered.

The elimination of private investment in utility properties can only result in a shifting of the burden of taxation now carried by the private utilities to those forms of private capital remaining untouched by the incursions of governmental ownership. The proper functions of government must continue, and in an increasingly complex social organization the *per capita* costs of maintaining these proper functions will undoubtedly increase. The elimination of large sources of tax revenue will thus entail a change in the incidence of taxation and an increase in its intensity upon the remaining sources of tax income. A complete analysis of the results that may reasonably be expected from the operation of all municipal systems by existing private systems must, therefore, give full consideration to the taxes that would have been paid under private operation.

The results of this analysis are presented on the ac-

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companying tabulation. The application of the rate differentials would have resulted in slightly higher total domestic revenues, due to higher private-plant rate levels in two of the seven geographic areas considered. The small commercial group was consistently higher, although, as previously noted, only to the extent of the tax differential. If all operations for the effect of the tax differentials had been adjusted, there would have resulted a total savings, representing additional funds for expenditure in other economic fields, of \$6,765,000 on revenues of \$104,832,812 from the three groups combined. This total net difference is a measure of the actual disparity between private and municipal plant costs, as such costs directly affect the consumer/taxpayer.

TABLE I
ESTIMATED OVER-ALL SAVINGS TO THE PUBLIC
THAT WOULD HAVE RESULTED FROM PRIVATE OPERATION
OF MUNICIPAL ELECTRIC SYSTEMS

Data Developed from 1932 Census of Electrical Industries

	Residential Service	Small Light and Pwr. Service	Large Light and Pwr. Service	Total of Three Groups
Total M kilowatt sales. . . .	1,379,390	1,265,596	448,863	3,094,949
Total revenue actually received.	\$64,769,464	\$32,411,579	\$7,651,769	\$104,832,812
Additional total revenue that would have resulted under application of private plant rates.	\$ 640,000	\$ 3,490,000	—	\$ 4,130,000
Additional taxes that would have been paid by private plants — 10% of revenue	\$ 6,540,000	\$ 3,590,000	\$ 765,000	\$ 10,895,000
TOTAL OVER-ALL BENEFIT TO PUBLIC THAT WOULD HAVE ACCRUED UNDER PRIVATE OPERATION. . . .	\$ 5,900,000	\$ 100,000	\$ 765,000	\$ 6,765,000

In the above analysis no consideration has been given to the inherent difference in the average levels of the "cost of money" to municipalities as compared with

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private enterprises. This dissimilarity is basic with the methods of financing that are available to the two types of operation. Thus, municipal enterprises are able to finance entirely through the medium of bonds at relatively low interest rates while the private systems must seek a portion of their capital through higher cost securities.

Whereas the private utility systems require an over-all average return in excess of six percent to meet interest and dividend charges, the municipal enterprises can finance at a net cost two to two-and-a-half points lower. This is possible because the purchaser of municipal bonds is making a loan supported by the full credit of the particular governmental body, which body can levy taxes to cover the payment of interest and principal. This right to levy taxes is enforceable in the courts and therefore, barring unduly depressed economic conditions or a gross overextension of governmental borrowing — with its concomitant increases in taxes to a confiscatory level — guarantees (so far as it is possible to guarantee any social contract) the fulfillment of the contractual agreement. The private utility has no such broad base upon which to finance and therefore can obtain, economically, not more than 50% to 60% of its capital re-

quirements through a direct mortgage upon its entire property — the balance being obtained through the medium of equities.

As capital charges are a major portion of utility costs it would be reasonable to expect that municipal operations could have offered service at very materially lower total cost than the privately owned systems. With reported fixed capital in excess of 500 million dollars (in 1932) municipal electric systems, if operated at comparable efficiencies and at a probable capital cost differential of two to two-and-a-half per cent, should have been able to furnish service at a saving, from comparable private-plant costs, of more than ten millions of dollars annually. As disclosed above, this result was not achieved. The lack of success can only be attributed to an inherent inability on the part of the municipal systems as a group to operate with the same degree of efficiency as the private enterprises.

With continued agitation for a vast expansion of governmental investments in utility enterprises there arises the question of how long the market for municipal bonds will continue to absorb them at interest rates materially lower than can be obtained from investments in private enterprises. This (*Concluded on page 366*)

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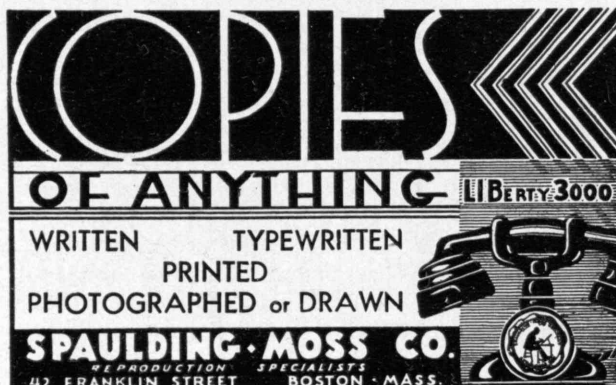
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THE STORY BEHIND YOUR LIGHT BILL

(Concluded from page 365)

natural trend to higher interest rates would affect not only the cost of such new enterprises but would also seriously impair the ability of municipalities economically to finance those functions that properly fall within the sphere of governmental activity. This result would have its inevitable effect upon general tax levels.

The Question of Governmental Operation

We thus return to the question of whether or not there is any necessity for, or advantage to be received from, vast governmental expenditures for the construction of competitive electric systems. A thorough consideration of the facts indicates the existence of very definite competitive influences affecting electric rate levels. These competitive controls tend to force prices for electric service progressively lower in the case of residential and small commercial service, and to keep prices at a level consistent with the general price structure in the case of industrial service. At the same time certain competitive cost barriers prevent the effective expansion of sales into markets already adequately supplied by other services. To develop these markets successfully would require rates below a sound economic level. To obtain such levels by means of governmental subsidies results merely in the transfer of costs from one group to another — a highly uneconomical process.

Although not previously discussed in this article it can be shown that the large average use values that accompany many abnormally low rates are the results of relatively few customers adopting electric service on a very expanded scale with the great bulk of customers refusing to adopt the marginal uses due to the existence of cheaper competitive services.

Electric service is essential to our existing social organization but the expansion of its use to fanciful levels is not necessary for the sound development of improved living standards. In fact, beyond certain limits, depending upon local conditions, the expansion of use is definitely restricted by competitive price barriers.

In view of these factors it is difficult to justify governmental subsidies for the purpose of offering competition, where effective competition is already present, or for the purpose of attempting to expand the use of a substitute service into competitive areas already adequately served. Furthermore, an analysis of the over-all effect of municipal operation in relation to private operation of utility services indicates greater efficiencies and lower over-all costs under the latter. Can any different results be expected under subsidized operations, if all true costs are included? Probably not.

From these facts one draws the conclusion that there exists no sound economic justification for expansion of governmental operations into the field of electric service. Whatever other reasons may exist, which justify this incursion into the sphere of private enterprise, are not known to the writer. It is difficult, however, to justify such expansion on any basis other than that of sound economics.

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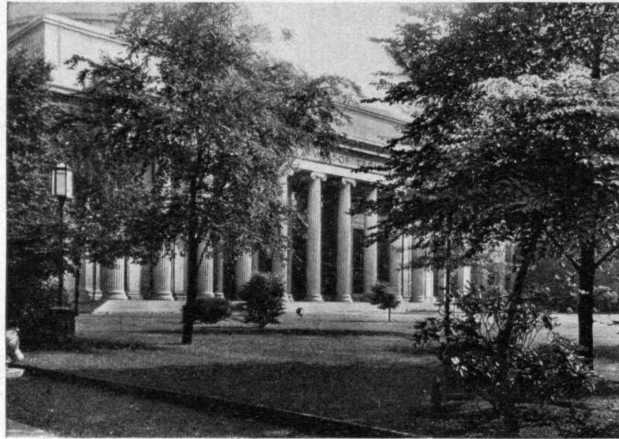
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Tech in the Far East

¶ "DUGALD C. JACKSON and Mrs. Jackson had a wonderful time both in Tokyo and Osaka with the Denki Gakkai people, by whom Professor Jackson had been invited to Japan. Last year was rather a busy one for receiving guests from your country. We found Mr. and Mrs. GEORGE M. GODLEY '98 among the garden party groups, and Mr. and Mrs. T. MITSUI '18 gave a luncheon on May 19, 1935, with about half a dozen of the fellow members here. Professor WIENER with his family on their way to China, was given a welcome dinner by Mr. and Mrs. T. Mitsui at Mitsui Club on July 26. This time the party numbered 22. During Professor Jackson's stay in Japan, from October 17 to December 22, we visited various factories and schools both in Tokyo and Osaka and also Kyoto. As usual Mr. and Mrs. T. Mitsui gave a welcome dinner at the same place on November 2, and 39 people turned out at that time. Then a high-speed camera film was introduced by Professor Jackson which was later given to Mr. Mitsui. In this film, through the high-speed camera in operation with a mercury arc light, show wonderful pictures when projected by ordinary speed." The foregoing was written by M. KAMETANI '25.

From the *Peiping Chronicle* of January 21, we learn that Professor Jackson delivered a lecture at the University Men's Club on "What Academic Research in the Physical Sciences has Contributed to American Industries." Professor Jackson writes that he has delivered "two lectures in Shanghai, two in Nanking, two in Peiping, and yet two for Tientsin."

A Marriage in France

¶ M. and Mme. Paul Dupuis have announced the marriage of their daughter, Mlle. Jeanne Dupuis, to MORRIS A. PARRIS, formerly assistant to the late President S. W. Stratton. The Review offers congratulations.

Awarded

¶ TO FRANK B. JEWETT '03, the Franklin Gold Medal "in recognition of his many important contributions

to the art of telephony, which have made conversation possible not only from coast to coast, but from this country to the other side of the world — contributions of which some were made by him alone and some by him in collaboration with other workers in the great laboratory of research which he organized and which he has directed with such signal success."

¶ TO WITTER T. COOK '24, as one of 43 General Electric employees to receive the Charles A. Coffin Foundation Award for 1935. This is the highest honor which a General Electric employee can receive and the recipients are selected from over 55,000 persons, in recognition of meritorious service to the company and the electrical industry.

From the Pen

¶ OF ALLEN B. MCDANIEL '01, a letter to the *New York Times*, March 30, 1936, congratulating them on the editorial, "After the Deluge." "We must begin at the headwaters," said Mr. McDaniel, "and utilize the fundamental elements of soil protection and conservation, including furrow cultivation and terracing of steep slopes and check dams in the smaller gullies, ravines, and other natural water channels. Coming downstream these preliminary control elements should be supplemented with the larger impounding, storage, and regulatory reservoirs, channel straightening, the proper canalization of streams, and the maintenance of natural floodways. Levees and spillways should be provided in the lower reaches of the major streams for flood control."

¶ OF WARREN K. LEWIS '05, "Application of Physical Data to High-Pressure Processes," in *Chemistry and Industry*, February 14, 1936. This is the published form of the address delivered by Professor Lewis upon receiving the Perkin Medal, January 10.

¶ OF CHEE-SING HSIN '14, "A Résumé of Recent Construction Works in Tsingtao," in the *Far East Magazine*, December, 1935. After outlining the various civic projects Mr. Hsin says: "The aim of the present administration is not only the development of the industrial and commercial inter-

ests of the city proper, but also the attainment of a higher and more satisfactory level of living for all residents in this territory."

¶ OF JAMES A. TOBEY '15, "Know Your Milk," in *Medical Economics*, March, 1936. It is surprising to learn that "every year there occur some 40 outbreaks of milk-borne diseases, with an average of more than 1,600 cases and 50 deaths. Most of these epidemics are caused by infected raw milks of low grade, and most of them occur in small towns." This article includes an interesting history of the study and purification of milk supplies.

¶ OF CHARLES KERR, JR., '22, "Motive Power for High Speed Rail Operation," in *Official Proceedings* of the New York Railroad Club, February, 1936. This is a report of work that is being carried on in the railway department of the Westinghouse Company to study the "various factors which determine the economic application of motive power to the railroad network of this country." This article is illustrated with charts showing tests on locomotive performance.

¶ OF DANIEL C. SAYRE '23, "They Had to Hang the Pirates," in the spring issue of *New Horizons* — a brief but appealing description of Nassau, which island can now be reached by regular air service.

From the Lips

¶ OF ALFRED P. SLOAN, JR., '95, in a report to stockholders of the General Motors Corporation: "Added responsibilities must be assumed by industry. Industry must assume the rôle of enlightened industrial statesmanship. It can no longer confine its responsibilities to the mere physical production and distribution of goods and services. It must aggressively move forward and attune its thinking and its policies toward advancing the interest of the community at large, from which it receives a most valuable franchise."

¶ OF DEAN A. FALES '14, at the Greater New York Safety Conference, on March 5: "If the present style trend continues, automobiles are going to be increasingly dangerous to drive." Mr. Fales stated that

modern designing is stylizing and not streamlining. The Review for April (page 276) carried an article by Mr. Fales on this subject.

¶ Of JOHN H. ZIMMERMAN '23, on "Failure of Metals" at the February 13 meeting of the Worcester chapter of the American Society of Metals. This talk included the behavior of metals under service stresses, fatigue of metals, effect of design, and many other phases of this important subject.

¶ Of FREDERIC W. NORDSIEK '31, broadcast over station WEVD, New York, November 22, a talk on "The New York Diabetes Association and Its Work." Further discussions of methods and problems in the attempt to control diabetes have been published by Mr. Nordsiek in the *Diabetic Journal* (London) in the October, 1935, and January, 1936, issues.

Societies

¶ At the 88th annual meeting of the Boston Society of Civil Engineers on March 18, the following officers were elected: President, HAROLD K. BARROWS '95; Vice-President, KARL R. KENNISON '08; Treasurer, CHARLES R. MAIN '09. RICHARD S. HOLMGREN '19 was given the Clemens Herschel Award—an autographed copy of Herschel's "Frontinus and the Water Supply of Ancient Rome." The Desmond FitzGerald Medal was awarded to ARTHUR CASAGRANDE, formerly in the Soil Mechanics Laboratory at the Institute. Mr. Casagrande was elected a director of the Boston Society at this meeting.

¶ Technology will be prominent also at the semicentennial celebration of Sigma Xi which is to be held in June at Cornell University. President KARL T. COMPTON will speak, as will WILLIS R. WHITNEY '90, Vice-President of the General Electric Company in charge of research.

"The Rulers of America"

¶ Some years ago James W. Gerard picked out the leading men in our country. Among them were: CHARLES HAYDEN '90, in finance; PIERRE S. DUPONT '90, IRENEE DUPONT '97, and LAMMOT DUPONT '01, in explosives; GERARD SWOPE '95, in electrical equipment. More recently, Frederick L. Allen picked out 50 names important in Wall Street. Among these are five Technology men, several of whom appeared on Mr. Gerard's list also: CHARLES HAYDEN '90, WILLIAM C. POTTER '97, MATTHEW C. BRUSH '01, ALFRED P. SLOAN, JR., '95, and

PIERRE S. DUPONT '90. Of Mr. Allen's list 40 men had been to college. Technology ranked second, with the five above. Harvard was credited with 11, Yale with four, Amherst and Cornell, each three, but none for Princeton.

DEATHS

*See class notes for account.

- ¶ ELLIOT HOLBROOK '74, March 20.
 - ¶ GEORGE S. MOTLEY '80, February 19, 1935.
 - ¶ OSCAR BOHLEN '81, February 13.
 - ¶ EDWARD R. ADAMS '82, March 20, 1935.
 - ¶ ALANSON BIGELOW, JR., '82, March 7.
 - ¶ CHARLES A. COOLIDGE '83, April 1.
 - ¶ WILLIAM C. MOWRY '85, October 15.
 - ¶ JAMES S. DRAPER '89, March 14.
 - ¶ LEWIS THOMPSON '89, March 25.
 - ¶ HARRISON S. BUFFUM '90, September 13.
 - ¶ HARRY BRADLEY '91, March 7.*
 - ¶ HENRY WEED '91, December 16.
 - ¶ HARTLEY DENNETT '92, February 28.
 - ¶ JOHN O. AMES '93, March 30.
 - ¶ ALBERT FARWELL BEMIS '93, April 11.
 - ¶ FRANCIS NORTON '93, December 1.
 - ¶ EDWARD D. FROHMAN '95, February 27.
 - ¶ HARRY W. DYER '96, January 29.
 - ¶ W. E. SPENCER DEMING '90, September 1.
 - ¶ GEORGE I. FISKE '98, March 29.
 - ¶ HARRY U. HART '96, March 15.
 - ¶ WILLIAM D. STAPLES '98, February 2.
 - ¶ KATHERINE C. DAVIS '02 (Mrs. Lincoln Davis), August 16.
 - ¶ FRANK Z. BROWN '03, October 4.
 - ¶ OTIS I. GODFREY '03, June 3.
 - ¶ HERBERT GODDARD '04, March 1.
 - ¶ GEORGE H. BRUCE '06, August 10.
 - ¶ LESLIE GREELY '10, December 4.
 - ¶ WILLIAM HORTON '10, February 9.
 - ¶ MARTIN J. GLENNON '14, September 27.
 - ¶ ALLAN HERRICK '15, October 14.*
 - ¶ MCCENEY WERLICH '15, March 11.*
 - ¶ SAMUEL P. MILLS '21, March 22.*
 - ¶ GEORGE A. MIDWOOD, JR., '22, February 18.
 - ¶ ALBERT E. SOUTHAM '22, February 11.
 - ¶ MUNSON T. ADAMS '23, April 3.
 - ¶ CLARENCE W. CHADDOCK '25, August 3.
 - ¶ WALTER L. JONES '25, March 8.
 - ¶ JAMES E. ALLISON '27, December.
 - ¶ LU-CH'ANG WU '28, January 30.
- Dr. Wu had been making an outstanding contribution to scholarship,

working with Tenney L. Davis '13 on translations from Chinese sources of early alchemy.

¶ BYRON HERRICK '34, March 19.

¶ JOHN M. BIGELOW, former staff member, February 29. From 1894 to 1898 Lieutenant Colonel Bigelow taught military science at the Institute, and from 1905 to 1910 he was here in the modern language Department. From the Army and Navy *Journal* of March 7, 1936, we quote: "He was born in New York City, May 12, 1854. He was a son of the late Honorable John Bigelow. His mother was Jane Tunis Poultney of Baltimore. He married Mary Braxton Dallam also of Baltimore. His father was Minister at the Court of Napoleon III during Lincoln's administration and during that time Colonel Bigelow spent several years of his early youth in France.

"Just before the Franco-Prussian War in 1870 he went to Berlin, where he studied at the University for a year, and then at the School of Mines in Freiberg, Saxony, which he left only to accept an appointment to West Point, which he entered the day he landed, in June 1872. In 1877 at the age of 23 he graduated from the United States Military Academy. Entering the cavalry as a young lieutenant he saw service on the Plains against the Indians as part of the vanguard in conquest of the West. As a Captain of the Tenth Cavalry during the Spanish American War he led his troops in the charge on San Juan Hill. Four times wounded in this engagement he was cited in General Orders for gallantry in action and awarded the Silver Star. After 30 years service he retired in 1904. . . . During the World War he again volunteered his service and was assigned to active duty in the office of the Chief of Staff in Washington.

"Colonel Bigelow was a fellow of the Royal Geographical Society, London, and a member of the American Geographical Association and the American Historical Societies. He was a member of the Century Club in New York and the Cosmos Club in Washington. . . .

"He is survived by his wife of 1836 Jefferson Place [Washington], his daughter, Mrs. Thomas Harlan Ellett of New York, and his granddaughter, Jane Braxton Ellett. Also surviving are his brother Poultney Bigelow of Malden-on-Hudson, two sisters, Mrs. Charles E. Tracey of Highland Falls, New York, and Mrs. Lionel Guest of London, England, and by many nieces and nephews."

COMPARATIVE SCHOLASTIC STANDINGS OF FRATERNITY AND DORMITORY UNDERGRADUATE GROUPS AT M.I.T.
(as of end of First Term, 1935-36)

	Comparative Standing (based on February '36 ratings)	Increase over June '35	Increase over Feb. '35
Fraternity Seniors.....	3.44	*0.03	0.12
Dormitory Seniors.....	3.49	0.07	0.14
Fraternity Juniors.....	3.21	0.07	0.05
Dormitory Juniors.....	3.30	0.02	*0.07
Fraternity Sophomores.....	2.84	*0.33	*0.07
Dormitory Sophomores.....	3.20	*0.14	0.10
Fraternity Freshmen.....	3.14	0.35	0.11
Dormitory Freshmen.....	3.146	*0.024	*0.064
General Average (Fraternity).....	3.15	0.02	0.05
General Average (Dormitory).....	3.27	*0.03	0.02

FRATERNITY SCHOLASTIC STANDINGS.

Comparative Standing of 24 Chapters (based on February '36 ratings)	Increase over June '35	Increase over Feb. '35	Comparative Standing of 24 Chapters over previous five-year period	Comparative Standing of Freshmen of 24 Chapters	Rating Feb. '36	Comparison with Chapter Rating
1. Theta Delta Chi.....	3.45	0.11	0.13	1. Phi Beta Delta.....	3.58	+0.46
2. Phi Delta Theta.....	3.39	0.08	0.11	2. Delta Psi.....	3.46	+0.38
3. Delta Tau Delta.....	3.30	0.074	*0.01	3. Phi Sigma Kappa.....	3.36	+0.155
4. Phi Mu Delta.....	3.28	*0.04	0.02	4. Sigma Alpha Mu.....	3.35	+0.096
5. Sigma Alpha Mu.....	3.254	*0.066	0.05	5. Phi Mu Delta.....	3.31	+0.03
6. Chi Phi.....	3.246	*0.124	*0.034	6. Sigma Chi.....	3.29	+0.143
7. Kappa Sigma.....	3.23	0.02	*0.03	7. Alpha Tau Omega.....	3.28	+0.37
8. { Delta Upsilon.....	3.21	*0.07	*0.115	8. Theta Delta Chi.....	3.26	-0.19
Phi Gamma Delta.....	3.21	0.11	0.136	9. Phi Beta Epsilon.....	3.22	+0.038
9. Sigma Alpha Epsilon.....	3.208	0.334	0.207	10. Kappa Sigma.....	3.19	-0.04
10. Phi Sigma Kappa.....	3.205	0.147	0.185	11. Beta Theta Pi.....	3.18	-0.005
11. Beta Theta Pi.....	3.185	*0.04	0.111	12. Chi Phi.....	3.15	-0.096
12. Phi Beta Epsilon.....	3.182	0.357	0.372			
GENERAL AVERAGE ALL UNDERGRADUATES.....	3.18	*0.06	0.00			
13. Sigma Nu.....	3.16	0.044	0.19	13. Delta Tau Delta.....	3.14	-0.16
AVERAGE ALL FRATERNITY MEN.....	3.15	0.02	0.05	GENERAL AVERAGE FRATERNITY FRESHMEN.....	3.14	
14. Sigma Chi.....	3.147	*0.056	*0.065	14. Phi Delta Theta.....	3.094	-0.296
15. Phi Beta Delta.....	3.12	0.21	0.053	15. Phi Gamma Delta.....	3.09	-0.12
				GENERAL AVERAGE ALL FRESHMEN.....	3.08	
16. Delta Psi.....	3.08	*0.08	*0.077	16. Phi Kappa Sigma.....	3.07	+0.06
17. Delta Kappa Epsilon.....	3.05	0.00	0.08	17. Sigma Alpha Epsilon.....	3.04	-0.168
18. Phi Kappa Sigma.....	3.01	*0.104	*0.10	18. { Delta Upsilon.....	3.00	-0.21
19. Alpha Tau Omega.....	2.91	0.00	*0.21	Sigma Nu.....	3.00	-0.16
20. Phi Kappa.....	2.88	*0.12	*0.125	19. Theta Chi.....	2.93	+0.11
21. Theta Chi.....	2.82	0.014	0.19	20. Phi Kappa.....	2.76	-0.12
22. Lambda Chi Alpha.....	2.80	0.14	0.14	21. Theta Xi.....	2.73	-0.06
23. Theta Xi.....	2.79	*0.316	*0.08	22. Delta Kappa Epsilon.....	2.68	-0.37
				23. Lambda Chi Alpha.....	1.06	-1.74
				24. Phi Kappa.....		

*Decrease

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

From Professor Turner

Professor C. E. Turner '17 of the Department of Biology and Public Health has written to Professor C. E. Locke '96 the following report covering that part of his trip around the world from Cairo to Manila: "In Bombay we looked up K. R. Minocha, VI, '28, who is with the Tata Hydroelectric Power Company. We got in touch with him on arrival, and he was most hospitable, helping to arrange our stay in Bombay, and having us out to his house for a delightful dinner with some of his friends.

"In Calcutta we enjoyed meeting several Tech men, including K. C. Biswas, II, '33, who together with some of our other graduates invited Mrs. Turner and myself to have Thanksgiving dinner, in the evening of Thanksgiving day, with a most delightful group of Indian men and women who had been students in the United States at some time or other.

"In Siam the Tech men arranged a special afternoon on the river for Mrs. Turner and myself, and we came back to Bangkok for tea. A Tech graduate who is one of the big men in the new government in Siam is Prasob Sukhum, I, '23. His present title is Pra Bisal Sukhum Vid, director general of the department of public and municipal works. He was, I believe, the first Siamese student to be graduated from Technology. Three young engineers from his department are being sent by the government this year to study at Tech. C. Chayabongse, XI, '32, is busily engaged in the task of establishing new water supplies, which the government hopes to install in a large number of towns. Perm Limpisvasti, XVI, '30, is at the Ministry of War. These and other graduates send most cordial greetings to you and other former instructors.

"In Batavia, Java, we had the pleasure of taking tea with W. L. Ogden, II, '16, and his mother. They have a delightfully attractive home.

"There is a large, active group of Tech men here in Manila. B. P. Abrera, XIII, '32, the Secretary of the Club, to whom you wrote, and several other Tech people including P. I. Dejesus, VII, '30, M. T. Manosa, VII, '21, and E. M. Lantin, VII, '31, met us at the boat. On Saturday, February 8, we had the privilege of joining the Technology group here at their luncheon around a big table in the grill of the Manila Hotel. M. T. Manosa presided. It was a most delightful affair.

"Next Sunday the Tech group is getting together again for a tea at the Manila Exposition Grounds, as the guests of Martin P. De Veyra, Jr., '08, who is assistant director of the Carnival Management. We have also especially enjoyed

our contacts with Dean E. R. Hyde, I, '06, the dean of the engineering school at the University of the Philippines.

"It has been a real pleasure to meet the various graduates, to see the contributions they are making in their respective countries, and to note the deep regard in which they hold the Institute and the various men under whom they studied.

"The list of people who attended the Sunday tea in Manila on February 16, at which Miss C. Ruth De Veyra and Miss Angelita De Veyra were hostesses, included the following: Professor and Mrs. C. E. Turner '17; Edmund G. Bromilow '26 of the General Electric Company; Pablo I. Dejesus '30, professor at the School of Hygiene and Public Health; Ernesto B. Ledesma '23, commercial manager of the Philippine Long Distance Telephone and Telegraph Company; E. C. Holbrook '12, Pacific Commercial Company; Juan T. Villanueva '26, mechanical engineer, Metropolitan Water District; Estanislao P. Angeles '32, professor of mechanical engineering, University of the Philippines; Andres B. Borromeo '27, engineer, lubricating oil department, Philippine Engineering Corporation; Jose C. Espinosa '22, chemist, Bureau of Science; Flaviano M. Yenke '29, chemist, Bureau of Science; Gregorio Y. Zara '26, division of aeronautics, Bureau of Public Works; J. E. Kiernan '22, technical naval aide, Office of High Commissioner; H. R. Wells '26, Air Corps, United States Army, Bureau of Public Works (Detail); Francisco D. Santana '32, engineer, Port Works, Bureau of Public Works; Ciriaco Coronel '31, mechanical engineer, Bureau of Public Works; Edward R. Hyde '06, Dean, college of engineering, University of the Philippines; Francisco D. Reyes '08, chief, division of tests and standards, Bureau of Science; Manuel T. Manosa '21, assistant manager, Metropolitan Water District; Timoteo Dar Juan '09, chemist, Bureau of Science; Emilia Lantin '31, Anti-tuberculosis Society; Martin P. De Veyra '08, assistant director, Philippine Carnival Association; Bernardo P. Abrera '32, yard engineer, Government Marine Railway and Repair Shops, Bureau of Public Works; Pacifico Rementilla '32, professor, Adamson School of Chemistry; Benedicto B. Padilla '27, professor, University of Sto. Tomae. Other guests were: Mrs. H. R. Wells, Mrs. G. Zara, Mrs. F. Yenke, Mrs. J. Espinosa, Mrs. F. De Veyra, Mrs. T. Dar Juan, Mrs. J. Kiernan, Mrs. F. D. Santana, Miss E. Adams, Mrs. J. T. Villanueva, Mrs. P. Rementilla, Mrs. M. Manosa, Mrs. Sangalang, Mrs. B. Padilla, Mrs. P. I. Dejesus."

M.I.T. Association of Buffalo

On February 26 Professor K. C. Reynolds '25 of the Institute addressed the Buffalo Alumni on the research that has

been done at the Institute in coöperation with the United States Engineers Corps with respect to their problems of building the new Cape Cod Canal. A lengthy discussion followed about the many and varied mechanical and electrical attachments which have been installed on the model built for the study of the problems of the canal. Professor Reynolds told us about some of the new phases of the work at the Institute and a great many questions were asked as to the activity of the various groups at Technology. Many of the older graduates were particularly interested in the stabilization of enrollment that the Institute will inaugurate this fall. In fact, so much interest was shown in all his topics that it was very hard for President Ferguson '22 to remind Professor Reynolds that his train was due in a few minutes. We were all sorry he could not stay longer, as the many phases of the work were most interesting.

We were very glad to have Paul Anderson '21 of Jamestown and Arthur Hinckley '08 and Robert MacMullin '19 of Niagara Falls with us, and a round of applause was given to these venturesome souls who drove through a mild blizzard to attend the meeting. Those who attended the dinner at the University Club before the address were: Paul N. Anderson '21, W. Grier Armstrong '28, George E. Barker '30, Robert Barker '21, Ralph D. Bates '14, John G. Brunner '34, Carl H. Bunker '32, Carl J. Bernhardt '28, Cutter P. Davis '19, John Duff, 3d, '35, George R. Duryea '17, Whitworth Ferguson '22, Edward E. Foster '33, Marvine Gorham '93, Robert L. Hershey '23, Arthur T. Hinckley '08, Paul Hansen '02, Ray Holland, Jr., '34, Robert B. MacMullin '19, Calvin H. Mohr '33, Bernard H. Nelson '35, A. M. Patterson '33, Thomas H. Speller '29, John S. Slosson '35, and Paul C. Warner '13.

During the day Professor Reynolds visited the school of chemical engineering practice at the Lackawanna Steel Company with Professor Hershey and also inspected the Curtiss Airplane and Motor Company, Inc. After luncheon he visited the Niagara Falls Power Company and the Union Carbide Company's research laboratories in Niagara Falls. We are most indebted to Raymond R. Ridgway '20, President of the Niagara Falls Technology Club, for arranging these visits in Niagara Falls.—CALVIN H. MOHR '33, Secretary, 1224 Cayuga Drive, Niagara Falls, N. Y.

New Haven County Technology Club

There have been three very successful meetings since the last report and there is every indication that the enthusiasm of the Club will be maintained throughout the balance of the year. On January 4 a

meeting was held under the direction of Harold G. Manning '12, beginning with a bowling match that lasted from four until six o'clock at the Waterbury Women's Club and ending with a dinner at the Hotel Elton, at which Lincoln S. Thompson, President of Sound Specialties Company of Waterbury, gave a most interesting talk entitled, "Newer Methods and Applications of Sound Recording." Mr. Thompson gave a brief history of the development of sound recording and then demonstrated the thin metal disc records that are now being used particularly for Talking Books for the blind. Everyone present made a brief recording on a record and it was then played back, giving the 25 men present much amusement.

The annual dinner-dance was held at the Parish Hall of the Congregational Church in Seymour on January 24. The attendance was extremely good with 17 couples present making it possible to meet all expenses. A very delicious dinner was served by the ladies of the church and a fine four-piece orchestra made the dance itself extremely enjoyable. Thurston C. Merriman '09, President of the Club, together with Mrs. Merriman, arranged all the details and was responsible for the great success of the party.

The Club was entertained by the New Haven Telephone Exchange on March 5 with Lawrence B. Grew '27 acting as host. In spite of unfavorable weather conditions there was an attendance of 35 members and guests. The group assembled in the library of the Telephone Company Building and after introductory remarks were made by Mr. Grew, Mr. Zollin of the traffic department explained the traffic equipment and operating details so that everyone would have a better grasp of the various functions of the dial equipment before seeing it in actual operation. His explanation was very clear and elementary enough so that everyone could easily understand it. Groups of five or six were then formed, each with its own guide, and shown the entire exchange right from the cable vault through to the switchboards, including the power and battery room and the dial equipment areas. After reassembling in the library, very interesting Telephone Company movies were shown and the meeting adjourned after a rising vote of thanks had been given to Mr. Grew. Everyone was impressed by the very efficient manner in which Mr. Grew had arranged the details of the program. Each group was routed in such a way that no two groups were at the same place at the same time. This made it possible for each man to view the equipment without having to strain his eyes or ears or be crowded the least bit. It was all planned in a very scientific way, true to the ideals of a Tech training. — ALBERT S. REDWAY '23, Secretary, Farrel-Birmingham Company, Ansonia, Conn.

Greater Salem Group

On Thursday, December 5, the Group held its third semiannual banquet and meeting at the Greycroft Inn in Beverly.

This meeting marked the first milestone of the organization which was formed about a year ago to enable the men from this district to have a semiannual get-together. After dinner a business meeting was held at which officers and representatives for the coming year were elected — several men from each town being elected to act as a governing committee for the Group. Following this, we had the pleasure of hearing short addresses: Professor Charles E. Locke '96 spoke on the formation of alumni groups; Dr. Paul H. Duff '16, recently from Texas, stirred up the party with a series of anecdotes such as are known only to medical men. Professor F. Alexander Magoun '18, speaker of the evening and professor of humanities, spoke on the need of caring for the human side of the engineer and what to date has been accomplished along this line at M.I.T.

Elections: President, Thomas K. Fitz-Patrick '33; Secretary-Treasurer, John D. Hossfeld '35; Representatives from Salem: Burton G. Philbrick '02, Howard C. Turner '02, and Clarence G. Root '32; Representatives from Beverly: Joseph Harrington, Jr., '30, Alfred A. Mulliken, Jr., '32, and Arthur B. Appleton '08; Representatives from Peabody: George E. McLaughlin '18 and Mark E. Kelley '09; Representatives from Marblehead: Raymond P. Miller '18 and Harris B. McIntyre '22; Representatives from Danvers: Robert W. Learoyd '25 and Edward S. Brown '21; Representative from United Shoe Machinery Corporation: Harvey S. Benson '12; Representative from Hygrade-Sylvania Corporation: Gerry E. Morse '30. — JOHN D. HOSSFELD '35, Secretary, 23 Hale Street, Beverly, Mass.

Washington Society of the M.I.T.

A regular luncheon meeting was held on February 21 at the University Club, Washington, D. C. Dr. Harry W. Tyler '84 presided in his usual inimitable manner and the guest speaker of the day was Dr. W. J. Humphreys of the United States Weather Bureau. Dr. Humphreys traced the development of meteorology since early history and told of the recent advances in that science. In the discussion which followed the talk, C. G. Abbot '94, Secretary of the Smithsonian Institution, briefly described some of his work in correlating solar radiation with meteorological phenomena.

Among those attending were: B. E. Lindsly '05, Katharine Carman '33, W. D. Rowe '24, F. W. Swanton '90, A. E. Hanson '14, W. M. B. Freeman '20, G. E. Wuestefeld '34, O. L. Hooper '23, J. D. Fitch '24, W. H. Brackett '35, Henry Rockwood '32, Carroll W. Brown '99, W. I. Swanton '93, W. E. Swift '95, W. B. Claflin '95, A. W. Greely, Jr., '13, G. Q. Voigt '29, F. A. Hunnewell '97, A. F. O'Donnell '18, M. L. Harris '24, F. E. Fowle '94, W. A. Danielson '26, M. O. Zigler '30, W. B. Moore '28, P. L. Dougherty '97, Howard F. Clark '12, H. W. Tyler '84, Allen Pope '07, C. G. Abbot '94, W. K. MacMahon '22. — JOHN D. FITCH '24, Secretary, 35 Montgomery Avenue, Kensington, Md.

M.I.T. Club of Western Pennsylvania

Jack Nichols '22, who left us for California last May, was in Pittsburgh for a few days in January and attended the Friday luncheon on January 31. — There is only one more bit of news for this issue: We are sorry to report the death of one of our outstanding members, William H. Horton '10, who has been associated with us since 1930. — E. J. CASSELMAN '15, Secretary, Mellon Institute, University of Pittsburgh, Pittsburgh, Pa. E. A. SOARS '21, Assistant Secretary, Townsend Company, New Brighton, Pa.

CLASS NOTES

1883

The following is quoted from the St. Petersburg (Fla.) Times, February 17: "Just in case some of our readers mayhap may have begun feeling rather fed up on the constitutional chaff doped out to voters so copiously for political campaign purposes by politicians who know little about the constitution and care less, perhaps a change of diet might be acceptable, and — there is the national debt. What about the national debt? Is there any bunk about the noise sought to be raised about that in some political quarters? Our friend and former St. Petersburg fellow citizen, Harvey S. Chase of Boston, an accountant who has spent a busy life in the world of finance and figures and who has a notable reputation as an expert in that science, thinks there is, and has written for *The Times* an interesting and informative discussion of the big subject, which being not ours at all, but all his, is given here. Mr. Chase says: 'Eliminating from consideration the debts of the states and municipalities in this country, there remain the debts of the Federal government aggregating some 30 billions of dollars.'

"Very great outcry has been going on since the present administration's policies have increased the gross debt by some nine billions, bringing it up to the figures stated.

"The question arises: How much of this outcry is justified and how much must be considered as arising from political antagonism, business timidity, 'economic illiteracy,' class shibboleths, and so on?

"Looking at the justification of such outcry first, it may be pointed out that concerning the increase of nine billions, more than half of it is offset by good claims for repayments which are now maturing and are being paid, so that in this particular a nine-billions outcry might logically be reduced by half and become a four-and-a-half billions outcry. However, and apart from this suggestion which is not likely to have any appreciable effect upon the volume of the outcry, suppose we consider other economic elements of this debt. What other questions naturally arise in relation to these governmental liabilities? Evidently one such question would be: How is this debt to be paid — whether considered at 30 billions

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1883 Continued

gross or 25 (or less) billions net? Quite aside from refinancing and reissuing portions of the debt as they mature, it is plain that ultimately a large part of the debt must be paid from taxation. Some portion of the debt, perhaps 10 or 15 billions, may be continued in perpetuity as heretofore and thereby the questions arising concerning this portion would be only the means for paying interest upon that portion as well as both interest and amortization requirements upon the remaining portions.

"However that may be, the next question in order would be perhaps: How will taxation provide for these interest and amortization requirements? In other words, who are to be taxed to provide the means of payment? It would appear that, under present taxation methods, corporations, banks, insurance companies, savings banks, business and professional firms, business men individually, and citizens generally (of the more provident or fortunate classes) must be levied upon to provide sufficient taxes annually with which to pay the interest upon the whole debt as well as the maturity requirements of those portions not otherwise provided for in each year.

"Following the Socratic method, we may next ask: To whom are these payments of interest and matured principal to go? Evidently to the holders (owners) of the government's liabilities (bonds and other governmental promises-to-pay). Who are these holders? Evidently, by the records, they consist of banks, insurance companies, savings banks, corporations, firms, business men, trustees for the oft quoted "widows and orphans," citizens generally of the more provident or fortunate classes, and so on.

"Are these the recipients of the government's outgo on account of its debts? It would seem so, who else? Not foreigners, not people or corporations outside of the United States to an appreciable extent?

"No, and to whatever extent such foreign holdings may exist, they are offset many times over by the American holdings of foreign liabilities. So the interest payments and the principal payments by the government go into the pockets of our own citizens.

"Well, how about those banks, insurance companies, and so on, who hold so large a part of outstanding bonds and other liabilities of the government? Yes, how about them? Who own the banks? The stockholders of the banks. Who own the insurance companies? The policyholders — in some cases, stockholders. Who own the savings banks? The depositors. Who own the corporations? Here comes a break — the holding companies! Who own the holding companies? Other superholding companies. Who owns them? Ask the courts (!) but finally, all the way along, there are citizen stockholders and at the end, the ultimate insulated holders are citizens also; or aliens, as the case may be.

"Socrates might then ask: 'It is plain then, that the owners of these government liabilities who receive the payments

of interest and the money redemptions of the bonds, and so on, themselves, are the same persons in general who pay the taxes from which these repayments are made?' It appears so. Through their ownership of the banks, the insurance companies, the corporations, and their own individual affairs, the thrifty and the lucky (inheritance) classes receive the emoluments from the government's debts, but before they can proceed to spend these enormous amounts which pour into their pockets annually, they must turn about and disgorge the greater part, sometimes all, of their receipts to meet the tax bills which the government presents.

"Death and taxes are inescapable, it is said, and even death does not escape taxes. Far from it, for through death duties, inheritance taxes, estate taxes, *ad nauseam*, the terrors of death are intensified. Gifts of principal during the lifetime of the giver are now-a-days soaked as mellifluously as bequests. There is no escape except by investing in tax-free securities; getting the income therefrom without tax outgo; but an horridifying congress, merciless and extravagant, threatens to take away this only sustaining joy of the departing plutocrat and render the thrifty one no better than the proletariat.

"Ah," says Socrates, "but are there not the sales taxes, whereby the soaking may be transferred to the millions of proletarians, who consume at increased prices, and thereby relieve the badgered millionaire?" Aye, there are such, but that is another story.

"So we reach the conclusion, do we not, that government debts — and this is as true of state and municipal liabilities as of Federal — are paid by the same people (in taxes) who receive the interest and maturities of the principal. Taking the country as a whole, we receive into one pocket and pay out of another pocket all the increases and decreases of our governmental debts and it is mere lypsochology which causes the fearful outcry concerning anticipated loss of confidence in our government's solvency and in the overemphasized demand that the budget must be balanced, willy-nilly, and the growth of Federal debt stopped, irrespective of the fundamentally pressing questions of the welfare of unemployed millions of citizens who have lost their all in this crisis, which came about through economic errors at the *top* rather than at the *bottom* of our business-minded population."

Harvey Mansfield of Tampa, Fla., who has lived so long in that state that he claims the right to be called a Florida Cracker, when commanded by the Secretary to tell of his early struggles of 50 years ago, had this to say: "After having finished an engagement of some two years as chemist with a Boston fertilizer company, I received one day in the early spring of 1886 a telegram from the treasurer of a paper pulp manufacturing company asking me to come to Young's Hotel in Boston. As the result of that interview I agreed to leave immediately

for the mill, located in Fairfield, Maine, to take the position of chemist at the munificent salary of *nine* dollars a week. The treasurer explained that the highest paid man (excepting the superintendent) about the plant received only \$12 and it would make trouble to pay a chemist as much as the head bookkeeper.

"The plant had been losing money for years and the new chemist was soon convinced that it wasn't a chemist that was needed but someone to keep the plant in continuous operation, as breakdowns and other interruptions were frequent. Well, the directors, before long, had the same idea, and much to his surprise the chemist was made superintendent. Then in 1886 began some of the most closely confining but interesting years of his life, culminating, fortunately, many years later with the satisfaction of turning the plant over, out of debt and paying good dividends." — HARVEY S. CHASE, *Secretary*, Bridge Street, South Hamilton, Mass.

1885

Professor Charles R. Richards, who recently passed away, was one of the outstanding members of the Class. The Architectural League of New York recently awarded him the Michael Friedsam Gold Medal. The citation read: "Distinguished educator in the fields of science and art, and notable for his constructive contribution to each; quick in his understanding of the importance of the alliance of art and industry; foremost in the giving of practical, effective help to the accomplishment of this end, the Michael Friedsam medal is given in worthy recognition of his service, a part of the history of the arts of decoration in this country." — ARTHUR K. HUNT, *Secretary*, 145 Longwood Avenue, Brookline, Mass.

1887

Several of the Class have been heard from since the last notes, and the Secretary takes pleasure in recording the latest news flashes. George Draper writes from San Pedro that he is getting over a slight attack of the flu, but otherwise is feeling pretty good. This is encouraging, at least, and we hope to hear from him at greater length before the July edition of The Review goes to press. — Frank Brett writes from North Duxbury that he is still engaged on planning projects, "but my job is apparently much more comfortable than Very's," he adds. There is much truth in that last remark.

George Sever says he has been employed as timekeeper on a WPA project of "Farm to Market Roads" in Kingston "and have to keep time of about 30 men for two eight-day periods in the month. Besides this, have to compile at home reports of our progress and costs. There are no farms and no markets, but it provides employment for numerous men. I am again running for selectman and public welfare, but as many others are doing the same thing I may be only a runner-up. Lots of snow and ice and zero weather, but it is healthful to be out of doors in the open spaces. Lots of good wishes to all."

1887 Continued

Arthur Nickels, from whom we are always glad to hear, writes very interestingly from his Bath, Maine, home, relative to the recent magazine article entitled, "Father Struck it Rich," which recalled memories of his mining career in the West during the "Gay Nineties." Let Arthur tell it himself: "Draper writes that he did know Evalyn Walsh and pater and had read the former's bright story in the *Saturday Evening Post*. I also enjoyed the story since I knew Tom Walsh and wife very well when I was located in the San Juan mining district from 1896 to 1898. For two years I was assayer at a paying copper-gold ore mine at Red Mountain, about halfway between Silverton and Ouray. While there I did considerable assaying for Walsh when he first discovered the Camp Bird mine from which he made about \$10,000,000. At that time Evalyn and Vinson Walsh were eight or ten years old, and I saw them a few times.

"Tom Walsh gave us a few dinner-and-dance parties at Ouray, the beginning of grander ones in Washington later. In this connection I have read this winter John Hays Hammond's autobiography, particularly enjoyable to me since I had something of the same experience in miniature. It is well worth reading. Draper in his letter of November 18 writes of Las Vegas and of the gambling there. I was there for a few days five years ago when it was not wise to be out after dark. — I shall hope to be present at our Fiftieth."

We were all saddened to learn of the passing on February 8 of one of the most active members of our Class, and one whose presence will be greatly missed, Charles Proctor. His death was very sudden, occurring soon after telephoning a friend to cancel an appointment. Ralph Curtis, Winthrop Cole, and Benjamin Lane represented the Class at the funeral services. The following obituary is from the Boston *Transcript*: "Charles Anderson Proctor, retired partner of the leather firm of Proctor Ellison Company, died suddenly today at his home, 297 Commonwealth Avenue, in his 70th year.

"Mr. Proctor, who for 40 years was engaged in the leather firm of which his father was a partner when he entered, retired from business in 1925. Since that time he has spent half of every year at the Proctor estate in Swampscott. Born in Boston, he attended the M.I.T. where he was graduated in 1887. He then entered the Harvard Law School and three years later became associated with his father, Henry H. Proctor. Mr. Proctor is survived by his wife, the former Grace Hopkins; a son, Henry Harrison Proctor, 2d; two daughters, Mrs. Richard H. (Barbara) Thompson and Frances Proctor, all of Boston."

The Secretary is advised that another of the Class has passed on, this time Archibald McColl, a sketch of whose career is given herewith: "Archibald McColl died in his home in New Glasgow, Nova Scotia, late in December, 1935. He was 70 years of age. Mr. McColl was a native of Nova Scotia; he received

his early education in a high school of that city and later attended Pictou Academy and Dalhousie University and the M.I.T. After leaving college he entered the coal mining profession with which his family had long been identified, and in the course of time he was appointed secretary of the Nova Scotia Steel Company, the position which he held for a quarter of a century. Two years ago when the Nova Scotia government took charge of some coal mines in Inverness he accepted an invitation to assume their direction. He had resigned from this post shortly before his death. Mr. McColl was a member of the Mining Society of Nova Scotia." — NATHANIEL T. VERY, Secretary, 1 Hamilton Street, Salem, Mass.

1888

News flash of March 23, from our staff correspondent at Lowell, Mass., Frank P. Cheney: "I have lived in Lowell all my life and have never seen such a flood as is now raging. Many years ago when the locks and canals were built, Engineer James Francis demanded an extra high flood gate. He was laughed at, but insisted. The flood gate was built but never used. It is now lowered and had it not been, the center of Lowell would now be under water. The people of Lowell at the time the flood gate was built called it 'Francis Folly.' All honor to engineering efficiency! There are four bridges closed to traffic. The Concord River joins the Merrimack here and the water at the bridge in East Merrimack Street has risen 25 feet, flooding all buildings. The water is up to the top of the fence of the bridge. Our \$1,000,000 auditorium has its basement flooded. I fear for the foundations. Last night people living in that vicinity were removed by boat. At Central bridge the water has risen about 20 feet and is flowing over the roadway. It is feared that the bridge will go out. Moody Street bridge stands with water lashing its girders. This is a deck bridge. If logs or a building strike it, it is gone. The Pawtucket bridge is a concrete arch and I believe it will stand. The Aiken Street bridge still stands but we can't tell what may happen to it.

"The Pawtucket Falls are level, just a raging torrent smashing viciously at the piers of the bridge. All lowlands are flooded; people were removed by boats. It is a pathetic sight to see the houses half covered. All policemen, firemen, national guardsmen, legionnaires, and Boy Scouts are on duty. The Red Cross has taken over the armory and is doing great work. Mills are closed, being flooded, and this causes crowds on the streets. The superintendent of the Vesper Country Club told me this morning that the Island is completely flooded, both bridges gone. One was the longest suspension bridge of its width in the world, 550 feet by four feet; the other had an 80-foot span. The club house is flooded in the basement. You can imagine the damage to the golf links, tennis courts, shrubs, and trees. The city water supply is affected and has to be boiled for drinking purposes. I shudder when I think of the damage from

silt and mud and the condition of the submerged buildings. The armory and school buildings are being used to house homeless people. It is believed that the peak has been reached. Let us hope and pray so."

This March flood news is from our staff correspondent at Lawrence, Ivar L. Sjostrom, President of the Lawrence Dye Works Company: "The water came up in the lower story of our plant about five feet and covered everything with about a quarter inch of mud, putting one of our generators out of commission. Fortunately we have a spare steam plant that we could start, so the only time we lost was about one day. The water came up about as quickly as I ever remember it. We left here at five o'clock last Friday night and the water had come up very slowly all day. We thought we were perfectly safe and had everything ready to put a cofferdam around our generator, which would have been the usual procedure. Coming back at six o'clock we found the water had risen three feet, and before midnight it had gone up another five or six feet and completely covered everything, so a cofferdam even would have been no good.

"I came down at midnight Friday to look at the dam and it was quite a sight. The water was then about a foot from the steel work on the Boston and Maine Railroad bridge. Another two-foot rise would have made an ice blockade and the bridge would probably have gone out.

"Forty years ago I can remember quite well driving around with horse and buggy with my father to look at the flood conditions, and this time my son took me around in his car to examine flood conditions. Forty years ago the street railways were just coming into their own and had a fine power plant in which the fire was put out by the extreme high water. That power plant has now disappeared and a large garage for busses has taken its place. Forty years ago there was no Wood Mill, Ayer Mill, Everett Mill, Kunhardt Mill, or various other plants in existence, and during the 40 years some of these plants not only have risen but have disappeared from the textile field.

"It is very difficult to do business under present-day tactics, and I doubt whether the country will ever make sufficient recovery to bring about normal conditions without having some major operation performed on it.

"We are having a hard rain today and the chief engineer of the power company has called me since I dictated the first part of this letter and told me that he fears we are going to have just as high water as we had last week. I hope he is wrong."

A recent travel note in the social column of the Boston *Herald* reported that: "After a month's sojourn in Palm Beach, Fla., Mr. and Mrs. Edwin S. Webster have just returned to their home in Chestnut Hill. They are anticipating a visit from their daughter, Mrs. Richard Harte and their four grandchildren, Jane, Nancy, Oliver, and Richard Harte, Jr.,

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who will arrive this week [March 23] from their winter home in Parkersburg, W. Va."

The following was also in the Boston *Herald*: "Walter K. Shaw's *Andiamo* is now undergoing changes in rig and interior plan at Oxner's Yard, Marblehead. The *Andiamo*, known as the 'White Ghost,' will likely be equipped with a loose-footed mainsail and go after the M Class honors in a serious manner."

The above items are out of turn, but they simply could not wait for the July notes, at which time we will continue with Ulie Holman's reminiscences of our four years at Tech. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine.

1889

Annie G. Rockfellow, who is an established and successful architect at 602 North 7th Avenue, in Tucson, Ariz., has recently been on a visit to Mexico City which she liked very much, all except the new modernistic architecture which she says hurt her eyes in that charming environment. She has also flown to California and liked it, and has tantalized the Secretary by accounts of picnics in the prehistoric ruins around Tucson. If properly invited she might fly East for the alumni doings this year. The Secretary is trying to encourage her in this idea. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston, Mass.

1891

Our classmate Professor Harry C. Bradley passed on, Saturday morning, March 7, after a six weeks' illness. The Secretary was away on a trip at the time and neither he nor Barney Capen knew of Harry's death until after the funeral. The following appeared in *The Tech*: "Professor Bradley was born in Plaistow, N. H., in 1871. He attended M.I.T., graduating in 1891 with a degree in civil engineering. After seven years of experience in the field of general engineering, he was appointed an instructor in the Institute's Department of Drawing in 1897. In 1908 he was promoted to assistant professor, and in 1919 became associate professor."

"Professor Bradley was the author of a number of articles published in scientific journals. His textbook on descriptive geometry, published in 1917, has been widely used in college instruction. Interested in many fields of scientific thought, he was a member of various societies, including the American Association for the Advancement of Science, the Mathematical Association of America, the Society for the Promotion of Engineering Education, and the American Association of University Professors. A man of retiring nature, he had, nevertheless, many close friendships among his students and professional colleagues."

"The funeral took place from the Waterman Funeral Parlor. . . . The professor and his wife, who survives him, resided in Dorchester."

The Secretary begs to report a very delightful trip to Jamaica, Panama, and Colombian ports on the United Fruit boat *Tolosa*. Charlie Tillinghast '95 was

my roommate as far as Barranquilla. William W. Lewis '89 and Mrs. Lewis went as far as Cristobal, and George J. Harrington '24 and Mrs. Harrington went all the way. Cartagena was most interesting as it is the oldest large city in this hemisphere, settled early in the Sixteenth Century. Zubiria '30 met us at the boat and showed us the sights. We met his father and saw the old Spanish mansion which has been in the family for 150 years and was built long before that. Zubie is married, has two children, and lives in a charming home in the newer section of the city. There are many things to see of historical interest, such as the old wall — it was a fortified city with elaborate defences and was sacked a number of times by the pirates. Philip II financed the citadel, a massive fortification, with underground passways, located on a hill near the city. This proved effective, was said to have cost 50 million pesos, and about broke the Spanish exchequer. Two old cathedrals, the inquisition, many very old buildings — there are few cities in this part of the world which are so old and have changed so little. They are to have a new water system, but things go slowly in Colombia and money is scarce. Barranquilla is on the River Magdalena, about 15 miles up from Port of Colombia and about 100 miles east of Cartagena. This is a modern city of Spanish type about 80 years old and of growing importance industrially. Tillinghast flew from here to Medellin, for a few days of business in connection with textile finishing machinery. It is some 300 miles to Medellin, and the latter is practically inaccessible at this time of year except by airplane, which is also true of Bogotá. In the dry season the river boats have difficulty in navigating and the trip may take two or three weeks, followed by train rides or mule back. There are practically no auto roads and only a few short stretches of railroad, but airplanes now go to all important points. The United Fruit Company take on all their Colombian bananas at Santa Marta, which is a small place but very old. The plantations are back in the hills and bananas come to the dock by railroad and are loaded by conveyors — from 40- to 70-thousand bunches on a boat. They have to be cooled to about 50 degrees as soon as possible to prevent ripening. Captain Barrett and the chief engineer showed me all over the ship, after donning suitable regalia. Crawling through cold air ducts was a new experience. One of the passengers had a two- or three-months old leopard for a pet and the radio operator, one a few weeks old. We offered two dollars a head for tarantulas, alive or dead, but failed to locate any. There are high mountains — the Andes — near Santa Marta but the country around Barranquilla and Cartagena is flat. This trip stops at Jamaica both ways, but only for a day. During most of the trip the temperature was 80 degrees to 85 degrees, day or night, but nice, cool trade winds, very hot in the sun. The water was about 78 degrees in the pool, which is about the average for the Caribbean.

THE TECHNOLOGY REVIEW

Gorham and Mrs. Dana went to Cohasset recently and showed Barney the movies taken at the summer outing at Aiken Manor. — Harry Young has been in Florida part of the winter. He motored from Boston to St. Petersburg, then to Miami; says he went to a dog race and lost four dollars. This calls to mind that the Secretary went to his first and only dog race in St. Petersburg, used a tipster's sheet, bet on the dog named to win the first race. The dog won; the Secretary collected the winnings — some \$35 — quit betting, and gave a dinner party.

A letter came from Charlie Garrison with no special news: Southern California has had a very dry winter; Charlie had a note from Mrs. Shattuck; he is working on his schedule for the trip East around May 1 — of course the chief incentive is our 45th reunion.

A recent letter from George Hooper mentions some class activities: "The first, which was a pleasant surprise, came in the form of a letter from de Lancey '90, who was urged to write by my account of my contacts with him in the early days of the Eastman Kodak Company, of which he was production manager. His letter contained, as you will see, a reference to Charlie Garrison, to whom I forwarded it. It appears that they were at school together prior to entering Tech, but that is Garry's story and I imagine that he will write you about it. At any rate, Charles returned the letter in person and he and my wife had a pleasant chat which I unfortunately missed, being absent at the time. We had our usual 'open house' on January 1, which was a beautiful bright day, most of the 'crowd' as usual going to the game from here. Due to the early sell out of the Bowl not so many of our friends had tickets, so quite a number remained at the house with us and listened to the plays on the radio. As I visualized it, it seemed like very ragged football, but our young people, who know more of the modern game than do I, assure me that I am mistaken and that the contest was really a very fine exhibition. I have not yet accepted their opinions."

"A day or so before New Year's, I was pleasantly surprised by a phone call from Jim Swan who was spending the holidays with his daughter in Hollywood. They naturally came over for the game, Jim stating that no parade on earth would induce him to get up in time to be on hand at nine A.M. It was a great pleasure to see him and know his daughter, whose attractiveness and fine mind make us want to know her better. Jim found an old friend here in Captain Curtis, Vice-President of the Morrill, Chapman and Scott Company, who are occupied with all sorts of marine construction and salvaging. Captain Curtis is now in charge of all of their enterprises on this Coast. Jim came over again a day or so later and we went to the Huntington Library and Art Gallery for an afternoon. I think that by now he is back in New York."

"There is a great deal to be said about Jim's refusal to attend the parade, as the exceptionally fine weather attracted a

1891 Continued

record-sized crowd which jammed the route of march, overwhelmed the policemen (of whom there were about 200 reserve men from Los Angeles in addition to our own force), tore flowers and other decorations from the floats, annoyed the young women who rode upon these, and greatly disarranged the order of the spectacle.

"The next pleasant occasion was a call from Arthur Alley and his sister who were returning to their home after an auto trip. Unfortunately we were out, but being in their vicinity on the following Sunday were invited to lunch with them and had a most pleasant afternoon in their home. Their spacious comfortable house with its pleasant, homy atmosphere is so situated as to command views of mountains on one side and ocean on the other and is set among almost all varieties of the semitropical vegetation which abounds here. Arthur has kept scrap books of snapshots of numerous reunions which we went over with much interest. He has also a collection of rare and unusual walking sticks, some of which could not now be duplicated, many also showing great ingenuity in their adaptation to special uses.

"Since late in December we have had one of those modern miracles, a rainy season with no rain. The drought, broken a day or so ago, was the longest on record, and we began to fear what next summer might have in store for us with the desert and mountain vegetation dry as tinder ready to be turned into a raging furnace by a carelessly thrown match or cigarette butt. The weather has been very mild. I have not yet worn an overcoat this winter and all of our flowering vegetation is blooming, long ahead of time.

"Our son has recently entered the employ of the Shell Oil Company in the research department of its Martinez, Calif., plant. This place is about 500 miles north of here on an arm of San Francisco Bay. His working schedule is such that he has a few days off about every two months so that we shall see him here often."

Robert Ball writes Barney: "Alas, it is inevitable that we lose classmates as time goes on, but still it always comes as a shock when those we knew are no more. Of those you mention I knew Arthur Howland the best and we were good friends when at Tech. Sol Stix I just remember but not so well as Shattuck and Knowles. I continue to have good news of my son in Kenya where he is enjoying his life and work. He is a great worker and is sure to do well. In his last letter he refers to an incident which shows the curious mentality of the native. He had some native workmen in to distemper his house and they had to stand on a chest of drawers to reach up. They carefully laid a bit of newspaper on top but nailed it on with two inch nails. Though close to the equator the climate is very like that we have here, for the altitude is such that the heat is tempered and there are glaciers within 100 miles on the slopes of Mount Kenya.

"Robin will be interested in what you say about the sea gulls at Salt Lake. Lake Naivasha, near which is his abode, presents a pink hue round the edges from the thousands of flamingos that roost on the shore. No one interferes with them, but the wild geese make an addition to the larder in season.

"I had a letter from Gorham Dana with a picture of him on the wall in China accompanied by a guide who looked like a brigand. However, as he happily got home safely, this gentleman was certainly not so bad as he looked. . . ."

H. B. Richmond '14, chairman of the Alumni Day Committee, wants us all to be on hand, Monday, June 8. There will be an interesting program ending with the Alumni Dinner that evening. Our Class should be well represented.

Notices for the 45th reunion will go out shortly. The date: June 19, 20, and 21; the place: East Bay Lodge, Osterville, Mass. — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R. I. BARNARD CAPEN, *Assistant Secretary*, The Early Convalescent Home, Cohasset, Mass.

1893

Herbert W. Alden, for many years chairman of the board of directors of the Timken-Detroit Axle Company at Detroit, Mich., was very seriously injured this past winter in an accident reported by William R. Kales '92 in a letter of March 18, as follows: "About two months ago, Alden, while inspecting a test of some kind in the laboratory of the Timken plant, had his overcoat caught in some running machinery. He was whirled around and badly hurt before he could be released, both legs being broken. His magnificent constitution, however, enabled him to get well started on the road to recovery. Then he had a relapse, but he is now doing very well. I have just been speaking with him over the telephone, and, to hear his voice, you would not think there was anything the matter with him. However, compound fractures mixed up with several broken ribs and a terrible mauling, do no good to any man. I think, however, I am safe in saying that he is well on the road toward recovery."

Toross Torossian, an Armenian who took the Civil Engineering Course with the Class and received his degree in 1894, has had a rather colorful life ever since in Bulgaria and in Persia (Iran). At long but fairly regular intervals he reports his activities to the Class Secretary and a letter from him has recently been received. From 1899 to 1906, with his brother, he was engaged in construction work largely in Persia for the Russian government. As between them they were able to speak the English, French, German, Russian, Persian, Turkish, Armenian, and Bulgarian languages and understood Oriental conditions, and with Torossian's engineering training, they succeeded particularly well in their work. Returning to Bulgaria in 1906, he was for a time in the flour business in which he had been en-

gaged on leaving Technology, and in 1909 he became municipal engineer for Lome, Bulgaria, a town on the Danube. During his five years' administration, water supply, sewers, electric lighting, public bathhouses, and parks were established and a dozen new schoolhouses built. In 1914 he established himself in private practice as engineer and architect at Lome. Early in 1934 he returned to Persia, now known as Iran, and during the past two years has been engaged in railroad work and building construction, and for a time served as consultant to His Imperial Majesty the Shah on the development of the province of Mazandaran which is almost entirely the Shah's property.

In his recent letter Torossian writes: "The present Iranians are not skillful builders. When we consider the rugs manufactured by them in which durability, economy, usefulness, exquisite coloration and magnificent design associate in perfect harmony, their superficiality in the art of building becomes incomprehensible. Iran was a great empire five or six centuries before Christ. It attained a high degree of civilization and culture. It had good highways and postal service. Some architectural motives (as the ogive) are of Iranian origin. During the reign of Darius the superman had to be skilled in the use of the bow, be a good horseman, and tell the truth. The first virtue has long been obsolete; the bearers of the second attribute have been transformed into aviators; as to the third virtue, for clever people all over the world, its antonym is often a good substitute for it."

Just now Torossian is supervising the erection of a dozen buildings for the Superior School of Agriculture at a distance of 80 kilometers from Teheran. He says that "thanks to His Imperial Majesty, who is a great reformer, Iran is being modernized rapidly. It has no debts and its budget is well balanced." Undoubtedly Torossian would greatly appreciate hearing from his friends in the Class. His address is "T. Torossian, *ingénieur-architecte*, chez Bijou, Khiaban, Naderi, à Teheran, Iran."

Charles G. Waitt, continental European correspondent for the London *Times* and other British and American newspapers, recently paid one of his brief visits to his Boston home, and to the Boston *Evening Transcript* supplied an article on European conditions, which appeared, with illustrations, in the issue of March 7. Subsequently, at least one *Transcript* correspondent criticized Waitt for seemingly pro-German leanings, but it will be noted, from the following excerpts from his article that his fondness is for the German people rather than for their government: "Germany still occupies the center of the stage, for upon her depends largely the peace of Europe. She is at this moment the most heavily armed nation, by far, in Europe and she is restless and chafing under her real or imaginary wrongs.

"Whether we are in sympathy with Hitler or not, we must give him credit for saving Germany from becoming a prov-

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"The tourist through Germany finds an outwardly prosperous and industrious country: Trains are punctual and comfortable; the restaurants supply good food and service; the shops are well stocked with goods moderate in price. No beggars are to be seen on the streets because Hitler has conscripted all the unemployed and put them in labor camps and to work on building highways and other governmental projects and has issued stringent laws to others prohibiting beggars in the streets. Those so conscripted receive their bed and board but practically no money and in this way Hitler has greatly reduced the number of the unemployed. . . .

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1900

Last summer at the reunion several of the boys suggested a yearly gathering and lately there have been a number of calls about the date, all of which leads the Scribe to feel that if a particular day was designated there would be enough turn up to make it worth while. How about Saturday, June 6, down at Cape Cod for a stag affair? We could arrive say Friday evening and get away Sunday. Anyway write to at least one member you would like to see and date him up. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

All aboard for the 35th reunion at Oyster Harbors, June 6 and 7. Get your bag packed, car greased, and an early start for the best time of your life with the old boys.

The Hartford *Courant* printed the following in its issue of February 13: "Literary Travels in Greece" by Guise, a book which has traveled through Europe and America for the last 160 years, is now in Waterbury in the private collection of Edward H. Davis of the Scovill Manufacturing Company, Waterbury, who told the story of the book's travels at the regular monthly meeting of the Technology Club of Hartford held Tuesday night at the City Club. 'The book began its journey in France,' Mr. Davis said, 'traveled to Russia, came into the court of Catherine, went back to Paris, thence to Germany, to Indiana, and then to Connecticut, finally coming to rest in Waterbury.' "Howard I. Wood, who sent me the above item, writes: 'The paper makes more of a point of the book than it made of the club members who were present, for apparently most of them do not include old and rare books among their hobbies. However, the story that Davis wove about the books and their history held the men in closest attention for over an hour. You may judge the depth of their interest from the fact that some of the questions fired at him recalled a recent trip to Germany and an anecdote about a copy of the Gutenberg Bible, which the men unanimously requested him to tell. So he spent another half hour telling how a taxi driver gave him a free trip to the beer hall where this Bible was and how, later, he took to the same beer hall a wild and woolly Western sheriff and a Methodist minister to see this volume.'"

Ralph Whitman, writing from the Navy Department in Washington, says: "Lieutenant Colonel John Bigelow, U. S. A., retired, died February 29 at his home in Washington where he had been ill four months. He was our military instructor during our freshman year. After 30 years' service, he retired from the Army in 1904 and for five years was professor of modern languages at M.I.T. As captain of cavalry during the Spanish American War he led his troops in the charge on San Juan Hill. He was wounded four times in this engagement and was cited for gallantry in action, being awarded the Silver Star. He was buried in the Arlington National Cemetery."

Philip W. Moore sends me an interesting picture from a Chicago paper in which appears Charles F. Kettering of General Motors Corporation, who received the Washington Award for the year 1936 for his high achievement in guiding industrial research toward the greater comfort, happiness, and safety of mankind in the home and on the highway. With him in the picture are Frank F. Fowle, President of Western Society of Engineers, and Frank D. Chase, chairman of the commission of award. Chase, you will recall, was graduated with our Class.

Robert M. Derby is located in New York where he is vice-president of Niles-Bement-Pond Company and in charge of their foreign business.

Charles I. Auer of El Paso, Texas, is an importer and exporter of walnut burl. Filling out his class questionnaire he

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Benjamin A. Howes, who completes the quartet of '97 men residing in Washington, D. C., is connected with the Resettlement Administration as chief of the materials intake and inspection section of the construction division. His duties cover a wide range of authority and responsibility. He interviews representatives of manufacturers who are desirous of placing their products before the government. Samples and technical description accompany each product. In this connection he maintains a complete sample and catalogue file that is available for the government architects and engineers who are designing low-cost housing groups for both the rural and suburban divisions of the Resettlement Administration. His duties include also inspection of all materials delivered to the different projects in the field. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street, Lawrence, Mass. CHARLES W. BRADLEE, *Acting Secretary*, 261 Franklin Street, Boston, Mass.

1900

Last summer at the reunion several of the boys suggested a yearly gathering and lately there have been a number of calls about the date, all of which leads the Scribe to feel that if a particular day was designated there would be enough turn up to make it worth while. How about Saturday, June 6, down at Cape Cod for a stag affair? We could arrive say Friday evening and get away Sunday. Anyway write to at least one member you would like to see and date him up. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

All aboard for the 35th reunion at Oyster Harbors, June 6 and 7. Get your bag packed, car greased, and an early start for the best time of your life with the old boys.

The Hartford *Courant* printed the following in its issue of February 13: "Literary Travels in Greece" by Guise, a book which has traveled through Europe and America for the last 160 years, is now in Waterbury in the private collection of Edward H. Davis of the Scovill Manufacturing Company, Waterbury, who told the story of the book's travels at the regular monthly meeting of the Technology Club of Hartford held Tuesday night at the City Club. 'The book began its journey in France,' Mr. Davis said, 'traveled to Russia, came into the court of Catherine, went back to Paris, thence to Germany, to Indiana, and then to Connecticut, finally coming to rest in Waterbury.'" Howard I. Wood, who sent me the above item, writes: "The paper makes more of a point of the book than it made of the club members who were present, for apparently most of them do not include old and rare books among their hobbies. However, the story that Davis wove about the books and their history held the men in closest attention for over an hour. You may judge the depth of their interest from the fact that some of the questions fired at him recalled a recent trip to Germany and an anecdote about a copy of the Gutenberg Bible, which the men unanimously requested him to tell. So he spent another half hour telling how a taxi driver gave him a free trip to the beer hall where this Bible was and how, later, he took to the same beer hall a wild and woolly Western sheriff and a Methodist minister to see this volume."

Ralph Whitman, writing from the Navy Department in Washington, says: "Lieutenant Colonel John Bigelow, U. S. A., retired, died February 29 at his home in Washington where he had been ill four months. He was our military instructor during our freshman year. After 30 years' service, he retired from the Army in 1904 and for five years was professor of modern languages at M.I.T. As captain of cavalry during the Spanish American War he led his troops in the charge on San Juan Hill. He was wounded four times in this engagement and was cited for gallantry in action, being awarded the Silver Star. He was buried in the Arlington National Cemetery."

Philip W. Moore sends me an interesting picture from a Chicago paper in which appears Charles F. Kertering of General Motors Corporation, who received the Washington Award for the year 1936 for his high achievement in guiding industrial research toward the greater comfort, happiness, and safety of mankind in the home and on the highway. With him in the picture are Frank F. Fowle, President of Western Society of Engineers, and Frank D. Chase, chairman of the commission of award. Chase, you will recall, was graduated with our Class.

Robert M. Derby is located in New York where he is vice-president of Niles-Bement-Pond Company and in charge of their foreign business.

Charles I. Auer of El Paso, Texas, is an importer and exporter of walnut burl. Filling out his class questionnaire he

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says: "On September 17, 1897, I left Cincinnati to enter M.I.T., so you see I am getting on. This week my grandson entered school at Las Cruces, N. M., he being just past six years of age. It's a long time from 1897 to 1935 and from Boston to Las Cruces is a long distance."

Harry V. Allen is in the sales and engineering department of the Elliott Company of New York, manufacturers of steam and electrical power machinery. He has a son who is a senior at Dartmouth and a daughter in junior high school. He writes: "It is rather difficult to list anything that is either news or interesting when one's work does not qualify as front-page stuff. I often admired and sometimes envied Allan Rowe's unique ability in this line." So does your Secretary! — ROBERT L. WILLIAMS, *Secretary*, 109 Waban Hill Road North, Chestnut Hill, Mass.

1903

Myron H. Clark has taken a position on the executive committee of Associated Management Counsel (Business Consultants and Managers) with office at 80 Federal Street, Boston. Clark is also conducting a business as consulting industrial engineer with offices in the Baer Building, Reading, Pa., and at 21 East 40th Street, New York, N. Y. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 89 Broad Street, Boston, Mass.

1905

These notes are being written in Dayton, Ohio, whence your Secretary was hurriedly called for a factory conference. A search through the class geographical file failed to find a single '05 man in Dayton. Will some good news gatherer please locate there, as we make no other periodic long distance news trips. Quiet must, therefore, be reported along the "western front," although Clarence E. Gage, II, breaks a long silence by writing from St. Petersburg, Fla., that after saving up his vacations with the Bucyrus-Erie Company, South Milwaukee, Wis., for 25 years, he and Mrs. Gage finally decided on a "wild tear" which has already lasted a month and taken them automobiling through several states to New Orleans, where they saw the Mardi Gras, thence to Florida, where they booked for the months of March and April. After that they plan a trip north through the Atlantic Coast states to New England, ending their journey "some place at the seashore where we can get steamed clams, swordfish, and fish chowder, and so on, about three times a day." We know the place, Clarence, and would gladly book you for a long stay for a reasonable commission. Clarence should arrive in our midst about the right time to take in Alumni Day and the 31st reunion at Old Lyme.

Such a newsy letter is very much appreciated, but the loss of items caused by this woeful lack of contacts causes this general suggestion to traveling classmates: Why not send us in advance your

itinerary of proposed trips, so that we can send you a list of '05 men living on the line of your trip, you to make contact as an assistant secretary without portfolio on some of the boys not reported on for years, extracting news that will be very useful to your Secretary. Perhaps Ros will tell us this isn't original; at any rate, it's worth trying. Some of us evidently lose sight of the class value of class contacts when the opportunity is just around the corner.

While the reference to the 31st reunion at Old Lyme is based upon possibility only, there is a strong desire from several sources, both from fellows who did and did not attend the 30th at the same spot. The consensus of opinion among those of the Boston and New York crowd from whom we have been able to get a written or oral expression is that we should have an annual get-together, probably at Old Lyme, on account of its meeting the average conditions of travel better than any other place. Further, it seems that we should not urge special effort on the part of fellows from distant points so energetically that the edge be taken off the five-year reunion. With the explanation that those too far away to be expected to take the 31st reunion in stride and may not receive word in another form, this is notice that the reunion will take place at Boxwood Manor, Old Lyme, Conn., on June 5, 6, 7. Those reading this notice and not receiving a direct invitation will please correspond with the Secretary, if it is possible to make it this year. Bill Motter, III, speaking for the New York contingent and with the approval of Ray Bell, II, and Maurice Landers, II, feels that the Metropolis would be as well represented as in 1935.

Continuing our winter-vacation news of last month, we learn that Graesser, II, spent a couple of weeks in Havana during February, and Motter visited Bermuda. Wouldn't it be great if all bosses would get tired of having their vice-presidents around in February, so that we could arrange a mid-winter reunion in some sunny land! The only trouble is that some of us haven't any bosses (vocationally speaking, at least); some others aren't v.-p.'s. Graesser suggests that at the next reunion we might show a film taken on his Havana trip. We wonder whether it wouldn't be interesting, especially if Carl appeared in the films surrounded by race horses, cups that cheer, or señoritas. Perhaps Bill has a similar exhibit, although his letter says: "We — the family — went."

John Damon writes hurriedly lest by error in The March Review someone might miss him at his new Washington, D. C., home. His telephone number is Randolph 9514. John apologizes for his inability to enter the Grandfather Contest just yet as his only child (a son) is only four years old; he keeps him "young and agile." Glad of that, John! You ought to be able to take old man Kenway's place in the '05 tennis doubles.

An oversupply of our Thirtieth Reunion Booklet was mailed to most of the secretaries of other classes as a guide to

proficiency in that direction, in case of their future desires. That the name '05 means to them something to emulate is evidenced by many gracious replies, to date.

Ros Davis, XIII, former Secretary and so on, reports in regard to classmate Reginald Fitz, V, that he is now professor of medicine at Boston University Medical School and director of Evans Memorial Hospital (a position previously held by the late Allan Winter Rowe '01). A clipping from the Providence (R. I.) *Journal*, dated March 20, tells us that Eugen F. Kriegsman, I, has been appointed acting director of the Public Works Administration in Rhode Island, and a detail of contracts totalling about a quarter of a million, which Gene had signed as his initial step, were listed. By a coincidence, the article immediately following gives the news of landings and take-offs at the Elmer W. Wiggins Airways — for instance: "Stinson Cabin Monoplane, pilot Richard Babcock, ship owner E. W. Wiggins Airways, left at 1:50 P.M. on a flood survey of Boston, Concord and Manchester, N. H., Leominster and Springfield, Mass., arriving on return at Providence at 7:45, one passenger." Evidently these Rhode Island boys are getting up in the world.

Notice is received from the Institute of the following changes of address: George G. Bay, II, from Ironton, Ohio, to Tryon, N. C.; Frederick M. Eaton, V, from Los Altos, Calif., to Box 146, Carson City, Nev. — FRED W. GOLDTHWAIT, *Secretary*, 175 High Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 209 Washington Street, Boston, Mass.

1907

Through a thoughtful note received from Dick Woodbridge, whose address is 2407 West 17th Street, Wilmington, Del., we have learned that his son, Richard G. Woodbridge, 3d, who last year was at Phillips Academy, Andover, Mass., and who is now a freshman at Princeton University, was placed on the honor roll at Princeton for his "scholastic achievements and ambitions" in March. Dick writes that he is very glad to note that our 30th reunion will be held at the Oyster Harbors Club.

Referring further to children of '07 men, we noticed an item in the Boston *Herald* of March 13 saying that Miss Helen Allen of Waban (daughter of Lawrie) was among the six Smith College students who were awarded "S" pins, highest award of the Smith College Athletic Association, at the student assembly on that date. — In the Boston *Herald* of March 15 our attention was arrested by the photograph of a mighty attractive looking girl and we discovered that it was Miss Barbara Allen, daughter of Charlie Allen of "Allenacres," Spencer, Mass., and that her engagement to Howard M. Booth of Worcester had been announced. Miss Allen attended Wheaton College, Sea Pines, and Fairmont School.

Professor Locke '96 of the Institute sent us a copy of a program of the meeting of the Canadian Institute of Mining and

1907 Continued

Metallurgy at Ottawa, Canada, from March 17 to 19 and called our attention to the fact that Kenneth Chipman was one of two conveners of a committee to welcome and entertain the ladies of the convention. This would seem to indicate that Kenneth is still going strong with the ladies. — From the Alumni Office comes word that E. Dexter Boles, of our freshman military-science fame, is now with the Board of Transportation of the city of New York, 126 West 53d Street, New York City.

In The Review of a year ago we congratulated one of our classmates, Ed Moreland, on his nomination, insuring election, to the presidency of the M.I.T. Alumni Association, and referring to the honor which had thereby come to our Class. Now again 1907 and one of our most loyal mates are honored by the nomination of Don Robbins to the same presidency. Since 1903, when Don entered the Institute, up to the present minute, he has always been ready to give thought and service to our Class and to Technology. We predict a most successful and intelligent administration. — Lawrie Allen, nominated for membership on the Executive Committee, will also bring honor to himself and to our Class by his tireless energy and enthusiasm and good common sense.

From Frank MacGregor, Buenos Aires, came the following welcome letter: "The Review for February has just arrived and as usual I first turned to the 1907 notes. I had noticed their absence in the January issue and note your remarks on the scarcity for February. So perhaps you can find a few 'squibs' in this letter. I was greatly pleased to receive signed greetings from 23 members who attended the class dinner on January 8. From a letter from M. E. MacGregor transmitting the greetings I note the conversation touched on Buenos Aires with Jim Barker telling of his experiences here. I find his trail still alive, in such forms as his picture on the wall of the rooms of the American Chamber of Commerce as a past president and in the bank of the First National Bank of Boston he is still remembered with pleasure by his friends.

"I presume Peabo had something to say, too, as he made a business trip down here some time ago. The city has changed and is changing — the third subway just going into operation and the fourth just now under construction. Life is very interesting here and I have set up house-keeping. What little Spanish I knew had to be augmented suddenly with a new vocabulary so that the staff and myself could get some concrete results as to food, transportation, and furnishing. Some funny episodes happened as will be remembered by anyone who has taken the first steps in learning a foreign language.

"There is quite a lot of boating here and some very fine yacht clubs, so I brought my cruiser and little sailing boat in order to explore the waters of the *Rios Plata*, *Uruguay*, and *Parana*. Just back this morning from a five-day cruise with two other bachelors who deserted their own boats for the trip. — Trust things

are going well with you and best regards to yourself and any classmates you see and especially to those who signed my greetings from the dinner."

In closing these notes, we urge every '07 man to support, by personal attendance and by frequent mention to other Alumni, the Technology convocation on June 8. A little later we will send out special notices, with the idea of securing the presence of even more '07 men than we had last year. But already you have received announcement telling of the opportunity for pleasure and profit in Cambridge on June 8. Save the date in your planning. — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Congratulations to B. Edwin Hutchinson on his election to term of membership on the Corporation. — It seems that we have a bridge champion in our midst: Hardy Cook was a member of the winning team in the Public Utilities Bridge League Tournament, held last January. Hardy is personnel director of the Brooklyn Edison Company. His partner in the tournament was William L. Holm of the same company.

John Mills has just published another book: "A Fugue in Cycles and Bels." "What electrical engineers are doing to music is told with fascinating interest in this up-to-date book. Radio and sound pictures are only preliminary moves in the advance of the electrical arts upon music. Electrical and synthetic music is in the future." Mills is a member of the technical staff of the Bell Telephone Laboratories. He is a fellow of the Institute of Radio Engineers and the American Physical Society. He is well known as an engineer and inventor (with a score or more of patents), and as an author.

The New York group held its spring luncheon at the Technology Club, New York City, on March 7. Professor Harry G. Pearson (Molly to all of us) was the principal guest at this meeting. But let Paul Wiswell tell about this in his own words: "At the spring luncheon of the Class here in New York we had 16 men to meet our old friend, Molly Pearson. I had not seen Molly since about the time I was putting on a uniform in 1917, but as I overtook him on Madison Avenue on the way down to the Tech Club he looked as familiar as in our undergraduate days. He told us later he had been at the Institute for 43 years. He seemed to be among friends as soon as the gang began to assemble. After lunch we all just sat around the table to hear him tell of the things that were happening behind the scenes while we were undergraduates: of the going of Prexy Pritchett; the coming of Prexy Maclaurin; the end of the discussion about merging with Harvard; the work of Professor Noyes before Maclaurin came. I think we all sensed that the Institute was not wealthy then, but few of us knew that Tech was living on a budget that seems, in these days, pitifully small.

The calls that Prexy Maclaurin made on Mr. Eastman may have been fraught with greater consequences than even they themselves realized at the time. I think we appreciated having Molly with us particularly because he is one of the very few men still active on the Faculty from all those we knew from 1905 till 1909. We all hope he has many active years still before him. — Chauncey Crawford is back in New York after many months in Washington."

It is with regret that we announce the death on February 23 of Laurance D. Chapman, President and Treasurer of the Hill and Cutler Company, New Bedford, Mass. Laurance was taken ill with a heart attack on Christmas day. He showed gradual improvement, but finally an infection developed which caused his death. He was born in Brookline, Mass., attending the public schools there and in Newton, entering the M.I.T. with the Class of 1909. Upon leaving the Institute he became connected with Hill and Cutler as junior salesman, and gradually rose to the head of the company. With the entry of the United States into the World War and while he was assistant treasurer of the mill, he left New Bedford as a member of the Fourth Company, Coast Artillery Corps, and served many months in France. He was promoted to a lieutenantcy overseas. He is survived by his wife and two children. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. *Assistant Secretaries*: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

1910

A tip from Abbott Allen when he dropped in to see me last month led your Secretary to look through back copies of the magazine, *Fortune*, with the following result: "Son of a missionary doctor, born in Peiping, educated (as a mining engineer) at the M.I.T., Paul Stanley Hopkins is one of the few taipans of second-generation stock. His first job was with the Standard Oil Company of New York; through its North China division he rose swiftly, was put in charge of its Hankow office, became Number 2 at Shanghai, became acting Number 1. When Electric Bond and Share, through its subsidiary, American and Foreign Power, was dickering with the Municipal Council for the Council-owned Shanghai Power Company it offered Mr. Hopkins the presidency of the latter. To Shanghai's surprise Hopkins jumped from the head of the greatest American trading company in China to the head of the greatest American (or Chinese) public utility in China, gaining much face thereby. Hardboiled to the point of ruthlessness and too dictatorial to be generally liked, he is nevertheless one of the dominant figures in the local business world and is supposed to be the highest-paid local American executive. Chinese have said that he is the only foreigner they know whose Chinese inflection is almost indistinguishable from that of a native. He has a comprehensive knowledge of the Chinese character; his slow speech masks a quick

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mind tuned acutely to the Chinese scene. No frequenter of clubs or giver of Shanghai's ubiquitous parties, his entertaining is done by his Smith-trained wife, who sees that he puts on the show his social position requires, and who comes close to being the social leader of the American community."

In the *Real Estator*, an organ of the Massachusetts Real Estate Exchange, there is an editorial on Federal housing, criticizing the impractical ideas of those in charge. Among the names listed is that of B. M. Pettit, assistant director of housing and chief of the initiation and recommendation branch. It is fortunate Pettit studied architecture, the profession where criticism is expected. — The following change of address has been received: Van Zandt Beall, PWA, Orange, Texas. — HERBERT S. CLEVERDON, *Secretary*, 46 Cornhill, Boston, Mass.

1911

Spring has just made her bow, as these notes are being typed, and while here in New England the entrance is on a flood of devastating force, there is a flood of enthusiasm among loyal classmates everywhere as we realize this is the spring since our graduation — the one in which we hold our Silver Anniversary Reunion. Swelling the list of probable attenders, add the following: E. J. Barry, II, Paul Cushman, VI, A. V. de Forest, XIII, Paul Kellogg, IX, Art Leary, XI, and Thorne Wheeler, X.

The closing weeks of winter have brought some welcome letters from classmates and this always warms the heart of a class secretary. Alphabetizing the data derived and summarizing: Charlie Barker, VI, still with B. F. Sturtevant Company on the West Coast, although now with headquarters at 553 Monadnock Building, San Francisco, writes that he and his wife and the children (boys, ten and seven years old) are fine; he likes San Francisco for business, but Los Angeles better as a place in which to live; he is happy to report that their older boy, who fell from the porch of their home at Berkeley just three weeks after they arrived from Los Angeles, sustaining a fractured skull when hitting the concrete sidewalk, is rapidly recovering, although it was touch and go for a while. Charlie says there is just a bare chance of his getting East for the reunion, but he'll be with us in spirit anyway.

Also from California — from Ventura, where he is practising law — comes a message from Stacy Bates, II: "I fear I shall not be able to attend the reunion this year much as I should enjoy doing so. I took a couple of months off last summer and made the trip East, which will have to suffice for the present. My regards and best wishes to you all."

With characteristic whimsey and delightful freshness, Bill Foster, IV, architect with headquarters at 25 West 45th Street, New York City, wrote in early March from 3405 Dent Place, N. W., Washington, D. C.: "Here I am in Washington with the New Deal; I am working in the Procurement Division. Some of my

friends think it is a good division to prostitute one's art. I'm engaged in designing post offices for — well, I guess, Jim Farley! I came down here in September, 1934, with a four months' contract and have been staying on; we none of us know for how long — maybe another four months now and maybe a year. One can get pretty annoyed at the red tape which surrounds all efforts to work for the government, but when I get most discouraged a pay day comes along and I forget the disadvantages of the system. With what architects have gone through the last few years, it is pleasant to have regular pay days and also it is very pleasant living here.

"It won't be possible for me to get to the reunion. I hope everyone has a good time and with prohibition gone there should be someone other than Pete White and me who dares to take a drink. . . . There is just a chance that I'm not getting old quickly enough, but I am retaining my tolerance — and enjoying life."

From the Alumni Office we learn that Joe French, IV, has transferred from Brooklyn to Detroit — no, not from the National to the American League — and is located at 13927 Ardmore Avenue, Detroit, Mich. — Paul Kellogg, IX, whom so many of us remember gleefully as Nero in the "Court of Nero" at our Ten-Year Reunion at the Mayflower Hotel, Manomet Point, Plymouth — where we are also holding our Silver Reunion, June 5 to 6 to 7 — is with Stevenson, Jordan and Harrison, Management Engineers, at their New York office, 19 West 44th Street, and writes a letter as refreshing as that of Bill Foster, saying:

"Certainly Mrs. Kellogg and I will do everything possible to get to the reunion in June and we're delighted that the committee has selected the Mayflower Hotel. I shall also be delighted to meet again the other grayhaired and no doubt portly members of the Class of 1911 who will have the nerve to show up. I have been rambling around quite a little, but for the last six years have been in New York City; three years with the National Industrial Conference Board and three years with my present employers. I have a married daughter living in Jersey and a son who is attending the University of Idaho 'of all places.' He started out to be a forester but I have just learned that heredity is stronger than environment and he is going to shift to mathematics.

"My hobby during all these years has been music and the whole family has contributed to the fun we have had — my wife playing the piano and viola, my daughter the piano and violin, my son the trumpet and French horn, and I fit in where I have to with either piano, organ, or 'cello. I also have been quite active in glee-club work, being director of the Nassau County Glee Club (men) and assistant director of the Flushing Orpheus Glee Club."

At this point comes a drab note: On August 4 at Vladikavkaz, Northern Caucasus, U.S.S.R., Professor Wladimir Mostowich, III, of the Inzvetmet, Metallurgical Institute, died, according to word

received from the Alumni Office. He was connected with our Class for some graduate work during our senior year.

On pretty good authority I have heard that Ralph Runels, I, has been appointed superintendent of the water department for the city of Lowell, Mass., but I await a letter from him in response to one of inquiry from me. — Ted Van Tassel, X, has been promoted by Hiram Walker Distilleries at their main plant in Peoria, Ill., and now has responsibility for the product from the time it leaves the stills until it is either sent to the bottling plant or shipped. "Due to the early date of our reunion," Ted adds, "prior to the time when Nancy's school term ends, it seems dubious whether I could get East for it, much as I would like to. You may be sure, however, I'll get to Plymouth if possible and I hope the rest of the Class will be able to be there in large numbers." — Ed Woodward, VI, western mechanical editor of *Railway Age*, with offices at 105 West Adams Street, Chicago, says: "It is still uncertain whether or not I can attend the reunion, but I shall make a desperate effort to be there. In any event, you may rest assured of my deep interest and best wishes for your success in holding the best reunion ever."

Heinie Zimmerman, IX, thoughtfully sent over from New York the following thumb-nail sketch from a chemical trade magazine anent Thorne Wheeler, X, whose appointment as vice-president of Arthur D. Little, Inc., Cambridge, Mass., we announced in last month's notes: "Mr. Wheeler was graduated from Yale in 1909 and from M.I.T. in 1911. Following graduation he went with the Southern Cotton Oil Company as chemist and had become works superintendent at the time of the World War, when he served in the Chemical Warfare Service as major in the technical development department on the large-scale development of charcoal and soda-lime manufacture for gas masks. He then became partner with Wheeler and Woodruff (Jack, X), consulting chemical engineers, joining Arthur D. Little, Inc., in 1925."

We certainly hope that you all enjoyed receiving the class rosters which accompanied the first current issue of *The Levever* and that with them you will make it a point to look up or write to particular friends of yours and urge them to attend our big party in June. Already Roger Loud and his committee are convinced that theirs is the task of engineering the largest reunion we have yet held and we are sure the committee will be more than equal to the task. In addition to attending the Silver Reunion at Mayflower Hotel, Manomet Point, Plymouth, Friday through Sunday, June 5 to 6 to 7, remember to plan to stay for Alumni Day at the Institute, Monday, June 8, when we — the 25-year Class — will occupy the position of honor in the alumni events of the day, culminating with the Banquet at Symphony Hall, Boston. Everybody up! — ORVILLE B. DENISON, *Secretary*, Hotel Bancroft, Worcester, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1914

As these notes are being written flood waters ravage the East. We have classmates in nearly every important stricken city. While there is little each of us may do to help any particular classmate, who directly or indirectly through conditions in his locality may have suffered, it is to be hoped that every '14 man responded through the Red Cross or his local agency to this great emergency. From the news that has come from the Connecticut valley we cannot but wonder how Jimmy Judge has fared. He has been valiantly trying to rehabilitate the paper business of his late father and was making excellent progress in shaking off the devastating effects of the depression. His mill is on the banks of the canal system of the Holyoke dam and his house is in South Hadley. Both of these sections are reported under water. To every '14 man who has been a victim of this disaster we all join in a sincere expression of sympathy.

In addition to his duties as a master at the Buckley School of New York, Frank Somerby finds time to be president of the Schoolmasters' Association of New York and Vicinity, as well as a member of the science committee of the Secondary School Education Board, an organization representing about 250 private schools from coast to coast. Then just for good measure Frank is serving on the governing board of the Coöperative Bureau for Teachers. — Butler Crittenden has joined the staff of the Hurricane Petroleum Corporation at Shreveport, La. Your Secretary tried to get a story out of B. P., but as usual failed.

Early in March the papers in the East carried reports regarding a red-hot speech in New York by Dean Fales. He appeared before the Greater New York Safety Conference and told of the hazards resulting from current practices in automobile design. Such conservative papers as the *Christian Science Monitor* and the *Boston Transcript* ran feature articles on the address. That Technology Alumni might judge for themselves just how hazardous automobile designs have become, Fales told his story to the Alumni Council at its March 30th meeting. (See also: *The Review*, April, 1936, page 276.)

Alumni Day is now shaping up in real style. Excellent speakers have been obtained for the Transportation Conference; a splendid entertainment program is awaiting you; a special series of interesting events has been arranged for the ladies; and 1914 will try to do itself justice. Your classmates await you! — HAROLD B. RICHMOND, *Secretary*, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N. Y.

1915

When other Class Secretaries boast of their class dinners I think 1915 is entitled to acclaim, for on March 16 at the Webber Memorial, we had our maximum attendance of all time with 31 men at the dinner. Around the table were: Frank Scully, Lloyd Chellman, Max

Woythaler, John Dalton, Larry Landers, Bob Warren, Easty Weaver, Herbert D. Swift, Louis Young, Pirate Rooney, Marshall Dalton, Archie Morrison, Fannie Freeman, Abe Hamburg, Pete Munn, Joe Livermore, Elmer Waters, Frank Murphy, Whit Brown, Evers Butner, Gene Place, Weare Howlett, Ralph Joslyn, Wayne Bradley, Frank Foster, Jac Sindler, Loring Hayward, Johnny O'Brien, Henry Sheils, Frank Herlihy, and your Secretary. Among these are a number of men whom we hadn't seen for many years and also several who came from a long distance, which speaks well for their class loyalty.

The dinner was opened with a furious reception to the new bridegroom, George Rooney, whose return post card read: "My husband will attend the class dinner . . .," signed by Mrs. George T. Rooney. A notation on the bottom read: "Be sure to have him home by 10:30 P.M., as I'll need him then." I am sorry to say that George was the life of the party, and I am afraid did not reach home in time to comply with Ethel's request.

The class gift — my beautiful strap watch — was on exhibition and I consider myself fortunate to have it returned to me intact. There were the usual gaieties of the evening, enlivened with games on the floor, singing, and cheering. In fairness to our class funds, I am glad to tell you that the printing was donated by Abe Hamburg and the liquid refreshments by other generous spirited classmates. This was, indeed, a jolly evening and shows that we have a splendid bunch of fellows in our Class. The movies that Herb Swift and Frank Scully took at the reunion were shown, amid much hilarity and pertinent wise cracking. Herb then took some movies of the dinner, and we are going to patch these all together in one long continuous film. Anyone who wishes may have this film by writing to me. We hope soon to have a dinner in New York, at which time we will show these movies.

Good old Chet Runels, who always loyally attends the dinners, wrote from Lowell as follows: "I will be unable to get to the class dinner on March 16, not because I lack the desire, initiative, or gasoline, but because of plain infirmities. Three weeks ago, thinking I was still young and active, I went skiing on Gunstock Mountain, N. H., and achieved the sixth of five broken legs reported on the mountain that day. I did not know that my leg was entirely broken at the ankle but thought it was a very bad sprain which probably accounts for the non-recording of the sixth broken leg. It also happened that I skied down two miles from where the accident happened instead of coming out horizontally on a toboggan, as was the current style that day.

"In any event, I have been cast in plaster of Paris since the fateful February 10 and have at least another three weeks ahead of me before I can start to walk, according to the doctor. Needless to say, I shall miss seeing the fellows very much. . . ." Chet should remember that life really doesn't begin at 40 when you go skiing.

In the midst of all these gaieties, it is sad to pause over the passing of our classmate, McCeney Werlich, who died in Paris on March 11. He was second secretary of the American Embassy. Werlich had been in the foreign service since 1925 and had been assigned to Riga, Warsaw, San José, Costa Rica, and Monrovia, Liberia, before going to Paris. His wife, the former Gladys Hinkley of Washington, and a son, Robert, survive. McCeney is well remembered by his impressive and dignified manner, and also by his loyal and active spirit as an undergraduate. To his family go our deepest sympathy in their loss. I have written to Mrs. Werlich in Paris extending the sympathy of the Class.

Allan S. Herrick, who left the Institute after his freshman year, died on October 14 at the Boston State Hospital in Mattapan. We have no record of Herrick's family, but if anyone knows of them, be sure to extend our deepest feelings.

Viking Enebuske writes from Tamworth, N. H.: "Since attending the class dinner in Boston in March, 1933, I have been living up here with my sister and her family, helping out on country home and farm work. In the middle of the summer of 1933, I went to New York City, and in October of that year, I was reemployed by Guggenheim Brothers on the design of a sewage disposal plant. Shortly afterwards I went to Bellevue Hospital, from there transferred to another hospital, and then to a veteran's hospital, and after a year and a half was discharged in April, 1935. Since then I have spent practically all my time up here doing light country work in accordance with my ability. This winter I have been trying to learn to ski, and there is plenty of snow up here that will probably last to April. — Remember me to all the fellows that I know." I am sure we will all be sorry to hear about Vik's tough time. I presume he has suffered from some war injuries, and we all wish him success, health, and happiness.

From Warsaw, Poland (Post Office Box 757), Benjamin W. Lassen writes: "I want to be frank in stating that this is the first time since school days that I have the opportunity and pleasure of writing to you. As you will recall, I entered the fourth year as a regular student in Course VI, with the idea of completing the undergraduate work in one year and getting my master's degree in another year, but things didn't work out the way I planned and I left at the end of November, 1915. I remember my very good friends, Phil Alger, Arthur Nelson, and DeBeech. Up to 1929, I was with Stone and Webster Engineering Corporation, Interborough Rapid Transit Company of New York, and the New York Edison Company. Since 1929 I have been a consulting engineer on my own. For a while I was in New York, but things did not go well, and I went in business promoting engineering projects in public utilities in the technically undeveloped countries of Eastern Europe. I have been in Poland now for about one-and-one-half years, and I find conditions gratifying

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1915 Continued

as compared with the dull times I had in the United States. I have brought over here from the States complete proposals on several engineering propositions. One is the complete equipment and consulting engineering work for a high-tension transmission line and a hydroelectric development including the financing.

"There is here a vast potential market for American engineering services. The prestige of American engineers in Poland is unquestionable. Wherever I go and with whomever I make contacts here on engineering propositions, I find that they are willing to give preference to American engineering ingenuity, enterprise, and organization. It is really surprising how we have neglected to take advantage of such conditions. Because of the great reputation American engineers have here among the younger engineers, most of these young men are studying English and are reading all the available technical literature. Of course, there are many peculiarities here, which the average American engineer at first would find difficult. Should any of our boys care to know more particulars about my activities or observations, I shall be glad to answer." This surely is an interesting reflection on foreign conditions and the wide-spread activities of one of our classmates.

Despite our 21 years out of college, apparently the single men left are not absolutely confirmed bachelors. From the New York *Tribune* of October 28 we read: "United States District Judge Charles Fremont Amidon and Mrs. Amidon of Fargo, N. D., and Westport, Conn., announce the engagement of their daughter, Eleanor, to Mr. Sidney E. Clark of New York." From the San Francisco *News* of December 24, we read: "The engagement of Miss Helen Frances Campbell, daughter of the late Robert Kelly Campbell and Mrs. Campbell of Berkeley to Donald DeFremery of Oakland has been announced." To these two prospective bridegrooms and their brides, the sincerest wishes of the Class for every happiness and success in life!

On our records we have been carrying William H. Gabeler, II, for a long time as deceased. I am, therefore, glad to tell you that Bill has come to life with the Davison Chemical Company, Post Office Box 2117, Baltimore, Md. I am writing to Bill with the hope that next month I can give you the news of his resurrection.

Our men stray from the fields of science and engineering, many of them into insurance and investments. For a good many years we have heard nothing from Allen R. Greenleaf. He is now in the investment business with Frederick M. Swan and Company, Boston. Pete Munn is president of the Associated Depositors, Inc., Boston, and has done some investment business with several of our classmates.

The *Electrical World* of December 21 says: "At a meeting of the 'Better Light-Better Sight Program' in New York last Tuesday, the James H. McGraw Medal for coöperation was presented to George E. Whitwell, Vice-President of

the Philadelphia Electric Company." Our congratulations to George for achieving this honor!

The aftermath of our enjoyable reunion last summer has been the awakening of the Class to even heartier coöperation than all my good friends have always shown. I have several letters. Orton P. Camp writes from 23 Randolph Avenue, Waterbury, Conn., that since the reunion he has been leading a quiet and busy life down there. From Sharon, Pa., Fred Vogel makes up for the last 20 years of silence: "I regret that I have not, perhaps, been a better classmate than I have. Most of the fellows with whom I associated seem to have disappeared and I have not heard from them for these many years. I have been employed by the Westinghouse Company since 1919. During all this period I have been in the transformer engineering department. First I worked up insulation design, then became in charge of insulation design, and at the present time am in charge of the design of the largest power transformers which the company builds. This does not mean very much just now, since the Utilities are not buying central station apparatus. Surely business in this line will improve and we can hope that this may be soon."

San Willis is an industrial and market consultant and can be found at 22 East 38th Street, New York City. From his close contacts in a wide variety of industries and among trade associations, advertising agencies, research groups, patent attorneys, and individuals who are conversant with scientific production and market developments, coupled with his experience in the analysis and appraisal of products and markets, San has built up an information collecting and distributing service which is unique and valuable to his clients' interests. He writes as follows: "I have recently seen Jim Tobey, Sam Berkowitz, and Frank Parsons. The latter has successfully recovered from his recent sickness. Tentative plans have been discussed for a class lunch or dinner soon (I hope to be in New York shortly to help arrange this). Ben Neal writes from Lockport, N. Y., that all is serene. Thomas Pond, formerly in Chicago, is now assistant vice-president of Johns-Manville Company here in New York. Don Perin may locate in New York. If he does, he will make a substantial addition to the class representation — actually, as well as figuratively. I shall be in Boston late in April and expect to bring my daughter, Margaret, so that she can give the Institute the once over and lay her plans for next fall. I think she will make the grade without trouble. As far as I know she will be the first of the younger generation to enter, and naturally I am just a bit proud of her, especially since she is far from the grind type, and manages to work in her full share of good times without letting her work suffer. Best regards to the Boston crowd and tell Louis Young that I am still waiting to hear from him."

I had lunch with San when he was here in the winter and I am looking forward to the pleasure of welcoming his young

daughter to the Institute. I am sure we can all join with San in being very proud of the first class child, especially a girl, to enter the Institute. Success to her!

At the dinner the men decided to have me urge you all to come to Alumni Day, June 8, in Boston. We shall try to secure rooms at a hotel near Symphony Hall, where the men and their families can gather early in the evening. Notices of this meeting will be sent later and we hope all will attend. Let's make it a big night for 1915. — AZEL W. MACK, Secretary, 72 Charles Street, Malden, Mass.

1917

Mr. and Mrs. Orin S. Rugg have announced the marriage of their daughter, Laura Frances, to Frank E. Peacock on Saturday, January 4, at Rockford, Ill. Mr. Peacock has the official congratulations of the Class. — Leo I. Dana, who followed his work in Physics at the Institute with the acquisition of a doctorate at Harvard, is now superintendent of research for the Linde Air Products Company. Scientists associated with his work consider him unusually well qualified.

George Daniel Doherty, associated with the Class for a period, now appears as vice-president in charge of industrial relations for the Refrigeration and Air Conditioning Institute, Inc., of Chicago. This organization trains men in various industries for air-conditioning work, the course being given partly by correspondence and partly by work in their laboratory in Chicago. He reports that Sherry O'Brien, who was also in Chicago, is associated with the Chrysler organization. He, too, has something to do with air conditioning and last spring escaped with his life when somebody used oxygen instead of nitrogen in one of the fundamental processes of trouble shooting.

Henry Strout, the apple and peach king of the Portland Rose Festival, was in the East recently. Continued expansion along lines indicated during his course at the Institute has retained for him the stuffed appearance affectionately hailed as Tubby. A visit with him is always an occasion and Tubby still maintains that Californian figs are superior to those from the Near East, although some of the bouquet of the foreign product is missing, perhaps due to the Californian climate.

At last, I spent a most enjoyable noon period with Edward Pennell Brooks of Sears, Roebuck and Company. Penn was good enough to desert the several conferences and committee meetings, that undoubtedly were dependent on his presence for action, and unhurriedly chatted of this and that. His health seems good; his disposition, as always, most charitable and engaging; and his vigor and interest in affairs, undiminished. He seems happy in his present associations and able to find ample expression for his unusual brand of ability and personality. As incidental to the various executive problems facing him he directs the policies of the radio division of Sears, Roebuck, which, as an independent organization, would rank with the country's larger manufacturing and distributing industries.

1917 Continued

E. B. Stockmann has a budget plan for the reunion and we are all waiting for him to put it down in writing and to push it forward. The New York group are giving serious thought to preparations for the 1937 Reunion and Leon McGrady recently met with several of them to make sure that their enthusiasm was kept at a high pitch. Professor Schell '12 told the group about the Institute's new dinghy plan and aroused enthusiasm for it.

A skirmish preliminary to the 20th reunion is proposed for this year to be held somewhere along the Long Island shore. The New York group are taking full responsibility for it and will pass their plans along in due time—RAYMOND S. STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

Recently it was our bright and precious opportunity to deliver an address in Haverhill, on which occasion Albert and Lillian Sawyer tendered us the hospitality of their home; filled us with costly groceries and good cheer. Al has been having fun designing an ice-cream freezer for use on the counter; the only detail to be accurately chronicled by one of our low tastes is the pretty girl operating it in the picture he exhibited. Young Frank Henry Sawyer took part in the evening's entertainment with all the ardor of a man of two.

Last year these columns were enlivened almost monthly by the name of Harold Weber, which—so we hear—caused singularly cryptic comments from some of his family circle. The 1936 model seems to be Bill Wills who is hereby dragged in by the Navy Yard Marines. The truth is that Bill himself has recently been chuckling with infectious laughter over a cartoon of his, plucked, bleeding, from the Navy Yard mail back in the emotional days of 1918. Bill, like Ernie Grunsfeld, Harry Katz, Al Williams, Ken Reid, and other equally misguided members of the Class, fought the War by hiding aboard the Admiral's barge in the small boat storage of the Boston Navy Yard. One bright and stimulating day Bill determined to reduce the tedium by drawing a cartoon for the Navy Yard paper. How could he know that every piece of mail was censored? Anyway, Bill's masterpiece landed on the desk of the Commandant, which salty and artless individual hardly clasped the thing to his bosom. The artist had been too realistic for that, for he had literally socked the Admiral in a sore spot by depicting with tactless disparagement the pretty confusion of a drunken riveter under the double bottom of a warship. The title, as we recall that wasted bit of genius, was: "A Wet Corner in the Dry Docks." Bill almost got 30 days on bread and water, but—at this distance—it seems worth it.—F. ALEXANDER MAGOUN, *Secretary*, Room 4-136, M.I.T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

What Ho, fellows! First we had the

Phoenix arising from its ashes, then Rip Van Winkle awoke from a lengthy slumber, and now 1919 stirs after an extended period of extreme lethargy.

For some unknown reason, the writer has been requested to assemble a collection of notes from you hermits and exiles to appear in The Review issues between now and Monday, June 8, at which time it is planned to have a meeting of the class members on Alumni Day to formulate plans to put our Class back on the map. There is no question at all in my mind but what we have as much spirit as any other Class at the Institute, and now is your time to show it.

What do you say, fellows, what about a reply by return mail before it slips your mind? All about what you are doing, how large the family is—at the present time—and whom do you see in the Class?—ARKLAY S. RICHARDS, *Secretary*, 26 Parker Street, Newton Centre, Mass.

1921

Last reminder of our June Jamboree—celebrating our 15th reunion—June 5, 6, and 7 at the Norwich Inn, two miles from Norwich, Conn.! Following our party, transportation will be available for taking the entire group to Cambridge where we will join in the general observance of Alumni Day on June 8. Regardless of whether you have attended all or none of our previous quinquennials, the very active committee headed by Dan Harvey, which has made the arrangements for our Fine Fifteenth, invites you to spend several days in the congenial atmosphere of true fellowship, to loll about the spacious lawns or terraces reminiscing over old times, or to share your experiences with the others of our big family while enjoying the many and varied sports on the program. Outdoors or indoors, you will find many opportunities for renewing old friendships and, above all, for contacting others in your own and other widely diversified fields. Come all, come early, and stay through Alumni Day. Combine your vacation needs with a good old technological toot and obey that impulse to live again among those whose lives are inseparably linked with yours. Return the acceptance form now, telling Dan that you will attend. If you haven't received details of the reunion in the mail, write Dan at the address below, and complete information will be sent promptly. See you in June!

A. B. Kinzel, chief metallurgist of the Union Carbide and Carbon Research Laboratories, New York City, sailed from New York early in January for Russia where he was due to address the Society for Science and Culture of the U.S.S.R. at Moscow on the subject of "Engineering and Stainless-Steel Alloys." A memorandum from Professor Locke '96 substantiates our understanding that Gus will be back in time to attend the Fifteenth.

S. Paul Johnston is another prospective reunion participant. In a fine long letter to Ray, Paul tells of his appointment as acting editor of *Aviation*, a magazine, published by McGraw-Hill, 330 West 42d Street, New York City. A loyal mem-

ber of the M.I.T. Club of Northern New Jersey, Paul makes his home at 847 Shadowlawn Drive, Westfield. Mrs. Johnston, Wellesley '23, Mary Carol, age 10, and James Irvin, 8, will see to it that Daddy doesn't forget the important dates in June.

A recent announcement tells of the engagement of Miss Elba Dahl, to Mr. Walter S. Bain of Brookline. Miss Dahl is the daughter of Commodore Dahl of Norway and the sister of Professor O. G. C. Dahl of the Institute's Department of Electrical Engineering.

It is with heavy heart that we record the passing of Captain Samuel Perham Mills, Air Corps, United States Army, in a plane crash, March 22. Captain Mills, a graduate of the University of Vermont, spent a year with us as a special student in aeronautical engineering.—Sincerest sympathy is extended to Mr. and Mrs. Ralph S. Wetsten of Summit, N. J., on the great loss of their young son.

June may also bring roses, but this time it'll be noted for the gathering of the 1921 clan at Norwich. Tell Dan, "Yes," now! A. D. HARVEY, *Reunion Committee*, Nash Engineering Company, South Norwalk, Conn.—RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Acousticon Division of Dictograph Products Company, Inc., 580 Fifth Avenue, New York, N. Y.

1922

This month we have a letter from William A. Riley which should be of special interest to the architectural members of our Class. Bill, who is with Stevens, Curtin and Mason, architects and consultants, 45 Newbury Street, Boston, Mass., writes as follows: "As a long lost member of the Class of 1922, I feel it is about time I wrote you of my whereabouts and activities. After graduation I went to work for several Boston architects and in 1923 started specializing in hospital work with Stevens and Lee, Boston. I remained with this firm up to 1932 when I returned to M.I.T. for further study in advance work in architecture. During 1933 I went to work for the United States government as chief inspector of construction at Fort Devens. In the earlier part of 1934 I started a year's hospital study in Europe as the holder of the James Templeton Kelley Fellowship in Architecture. I made an extensive study of hospitals in England, Ireland, France, Germany, Switzerland, and Holland, and upon my return went back to the firm of Stevens, Curtin and Mason, formerly Stevens and Lee, where I am at present. Last summer I received a commission from the city of Stockholm, Sweden, to spend four months in their research office in Stockholm, advising their hospital experts on the American methods of hospitalization. This was the first time the city of Stockholm had ever asked an American hospital architect to assist them.

"It might interest members of the Class to know I live at 31 Hawthorne Road, Milton, Mass., have been married since

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1925, and have two daughters, ages nine-and-a-half and five years. I shall try not to keep my activities so secretive. . . ."

Yardley Chittick is now practicing patent law with the firm of Heard, Smith and Tennant at 77 Franklin Street, Boston, Mass. Our Class seems to be a restless lot. Among the changes recently recorded are George P. Anderson, recently of New York and now residing at 163 Howland Circle, Danville, Va. A big jump has been taken by Homer L. Bigelow, Jr., who has moved from Boston to 1425 Canyon Road, Santa Fe, N. M. Robert P. Ramsey who has been on the missing list is with the Otto Engine Works, Holmesburg, Philadelphia, Pa. Richards J. Bard has moved from Wayne, Pa., to Manila, Philippine Islands, where he is with the Standard Vacuum Oil Company. Another one of our classmates who is located in the far corner of the earth is Max S. Salomon of Course X-A who is with the African Explosives and Industries, Ltd., Post Office North Rand, Transvaal, South Africa. In contrast with the above movements, we have word from Heinie Horn that, due to a broken ankle, he has been practically completely immobile of late. Luke Walton has resigned as vice-president and publicity director of Arnold Constable and Company to become advertising manager of John Wanamaker's. Luke has had quite a career in the retail department-store business. He began with L. Bamberger and Company, Newark, where he remained for several years after which he joined Arnold Constable and Company, as advertising manager. After two years with the Namm Store in Brooklyn as publicity director, he returned to Arnold Constable and Company as vice-president and publicity director.

Don't forget Alumni Day at the Institute on June 8. At the request of H. B. Richmond '14, chairman, Alumni Day committee, we are glad to bring this to your attention. The letter which we received from Mr. Richmond on this subject so well expresses the idea that we would like to quote part of it as follows: "An outstanding advantage of a technical training obtained at Technology is that it is never complete. Graduation simply marks the end of classroom routine. To get the greatest advantages from a Technology training, contact with the Institute should be continuous. At a class reunion contact is limited to one's classmates. On Alumni Day contact is possible with those of adjacent classes, as well as with prominent graduates in one's particular field. Technology men have, as a group, taken far too little advantage of present facilities of the Institute and of the advantages of contact with each other. Alumni Day is an attempt to correct this situation." — C. KING CROFTON, *Secretary*, Rochester and Pittsburgh Coal Company, 604 Lincoln-Alliance Bank Building, Rochester, N. Y.

1923

A date has been set for a get-together luncheon of 1923 men in and around Boston, but as these notes are written a week

before the date, March 30, a report on the success or failure of the affair must wait till the next issue.

Penn Howland, XV, reports that he has gone to work for the Boston Woven Hose and Rubber Company in Cambridge, and is temporarily living in Boston. Since graduation Penn had been with the Iver Johnson's Arms and Cycle Works in Fitchburg, most recently occupying position of assistant to the president. The death of Mr. Johnson in November and reorganization of the company side-tracked certain executives of the company and led to Howland's new connection. — S. H. Whitney, II, who has been with the bridge department of the New Hampshire Highway Department reports that he recently moved to Concord. — C. P. Thayer, VII, is physical director at the Health Institute of the Roney Plaza Hotel, Miami Beach, Fla.

A recent note from Jack Storm, XV, says: "I have been in Detroit as a salesman for the Carborundum Company for ten years and am still at it. Things are looking very promising and we have had several years of good business. If it keeps up I may some day see Boston again, which . . . I haven't seen since 1923."

Your attention is directed to the opportunities presented by the Alumni Day program planned for June 8 at the Institute. Under the direction of H. B. Richmond '14, this program will include having the instructing staff of the Institute on hand for conferences with Alumni, and a general convocation on the broad phases of transportation will be held. — HORATIO L. BOND, *Secretary*, 195 Elm Street, Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, 11 Broadway, New York, N. Y.

1926

To date 69 members of the Class have indicated their intention of being present at the reunion on June 6 and 7. A half-dozen others are anxious to come but remain in painful doubt. We wish to see this group who intend to come increased to at least 100.

Some of the comments on the questionnaires are interesting: One member of the Class desires information about airports contiguous to Winchendon, evidently planning to come by plane. If any other members of the Class are going to fly, we shall be glad to supply them with information about landing fields. "Have a fine feed and give us plenty of opportunity to meet and chew the fat with others in the gang" — "Present plans sound good to me" — "Don't cut the cost too much. I'll contribute \$10 to meet any deficit" — "Have Ray Mancha bring his banjo and put on an act" — "Have Killian mix the punch." The Secretary is puzzled by this last comment, particularly since he knows at least half a dozen other members of the Class more audacious and skilled in the noble art than himself, but he'll at least be willing to pinch hit.

Cedric Valentine and Mark Greer plan to bring together the famous 1926 150-pound crew to stage a race against any and all comers, probably on June 8.

J. S. Offutt dropped in the office from Chicago, the other day, to make sure that he was properly signed up for the reunion. He is assistant manager of the industrial sales department of the United States Gypsum Company. He reports frequent contacts with Les Currier who is with the Sorg Paper Company, Middletown, Ohio, and a noted amateur photographer. Offutt reported also that he had seen Howard Emerson, who is having a successful career in machine design and production with the Homer Laughlin Company, East Liverpool, Ohio.

Barrett C. Griffith may be found in the Bell Telephone Laboratories in New York. — Thomas I. Dowling is with Schutter-Johnson, 1016 North Cicero Avenue, Chicago. — A. F. Johnson, during the past year has been busy building a mill and reopening a low-grade mine about 12 miles west of Idaho Springs, Colo. He is general manager and vice-president of the company.

The list of those who expect to be present at the reunion includes: Arthur W. Baker (probably), Arthur E. Benson, Eliot N. Bidwell, Rufus L. Briggs, W. E. Carter, B. G. Constantine, Leland W. T. Cummings, Sydney Dach, Maurice W. Davidson, Robert T. Dawes, R. C. Dean, William W. Dunnell, Jr., Samuel Eskin, Emerson W. Eddy, Malcolm B. Epstein, George A. Fogg, Guy S. Frisbie (not sure), Anthony P. Gabrenas, Natale Gada, Leon J. Goldberg, Ralph A. Hammar, Eben B. Haskell, Ralph W. Head, Alton S. Heyser, Harry F. Howard, Bruce T. Humphreville, Howard Humphrey, John B. Jacob, Henry W. Jones, Herbert J. Kaufmann, J. Rhyne Killian, Jr., Donald B. King, Charles F. Kirsch, Albert C. Lamoureux, Howard Lane, William H. Latham, Joseph L. Levis, Richard S. M. Li, William P. Lowell, Dwight K. Luster, Charles E. McCulloch, John E. McMaster, Ronald J. Martin, William Meehan, Horace E. Nason, James S. Offutt, Thornton W. Owen, Nathan Pearlstein, Richard H. Pough, S. S. Randell, Jr., Charles Rich, Benjamin P. Richardson, Philip M. Richardson, Arthur J. Riley, Robert W. Rogers, William C. Sessions, George Warren Smith, Elton E. Staples, Alfred P. Steensen, Dwight K. Taylor, A. Flint Taylor, Cedric Valentine, Earl C. Wheeler, Abraham White, John B. Wilbur, Harold A. Willoughby, John H. Wills, B. V. Howe (doubtful), John R. Oakley, Ernest K. Warburton, Douglas A. Peterson. — Those who have not yet returned the questionnaire with their dues are urged to do so at once so that the committee may know what attendance to expect. — J. RHYNE KILLIAN, Jr., *General Secretary*, Room 11-203, M.I.T., Cambridge, Mass.

1928

Extra! Extra! Five Star Final! Class President has new heiress! We've practically had to stop the presses to get this in, but here it is. We are delighted to have the privilege of announcing the birth of a daughter, Roxanne, to Mr. and Mrs. Ralph T. Jope of 11 Valley Road, Winchester, Mass. The youngster made her

1928 Continued

appearance on the morning of March 31, and mother and daughter are reported to be doing well. We of the Class of 1928 salute our First Lady's first lady and send congratulations to papa Jope, who is doing as well as could be expected.

On February 18 a special letter was mailed to 625 members of the Class. Its purpose was to get news for these columns and build up a substantial fund which could be given by this Class in support of M.I.T. athletics. This practice has been followed by many of the more active classes. By March 28 your Secretary-Treasurer had received 82 replies (13.1%) and of this number 61 (9.7%) enclosed a dollar. The cost of sending the letter amounted to \$24.59 for stamps, envelopes, printing, addressing, and paper. No charge was made for labor or hand stuffing of envelopes which was done by Ralph and Florence Jope. (The Class extends its thanks!) The balance left for the class athletic fund is very small and we sincerely hope that the 543 classmates who did not answer will do so at once (even if no money can be sent).

Course XV leads in number of replies, so far, with a total of 16; Course II is next with 14; Courses VI and X follow with 12 each; then Course I, with 8 and Course IX with 5. From the 82 replies we learn that 23 men, or only 28% of the Class, are still single; 54 are married and of these 36 have children. In this group of '28 descendants are 32 boys of an average age of three years, two months, and 28 girls whose ages average exactly three years. Carl Kohler has the largest family: four boys, ages two, four, six, and nine. Dick Rubin heads the next group with three boys, ages five weeks (Congratulations!), three and five years. Also in this "three" class are Tom Wood with two boys, age four months (Great, Tom!) and four years, and one girl, age two-and-one-half years; Frank Webster has a three-year-old boy and two girls, age one and eight.

It will be impossible to cover all the replies in this issue. Therefore, we will follow the plan of "first come first served" and cover those men whose letters came in first. Les Forsyth has the lead-off honors. He is now the pillar of William Forsyth and Sons Company, who have the unique business of manufacturing butcher blocks, and so on, for meat markets. Les has one girl, age six, and is kept busy traveling around for his firm which is located in Lynn, Mass. — Ed Lockwood is now with the commercial staff of the New York Telephone Company. He transferred from the engineering department and seems very happy in his new location. The Lockwoods have one daughter, age two, and live at 62 Pierrepont Street, Brooklyn. — Art Nichols is back with his father's organization, W. H. Nichols Company of Waltham, Mass., who manufacture precision pumps. Art was formerly in Akron learning the rubber business, but returned to his first love. Two girls, age one and three, now make up the Nichols family.

Jack Barnes, whose recent marriage was reported in these columns, is now assistant professor of mathematics at Tufts

College. Mrs. Barnes is also a mathematician of note, having achieved a Ph. D. degree in this subject. — The Elliot B. Grovers (Tubby to you) have a new addition — a boy, age 14 weeks — and congratulations are in order. A girl, age four, completes the family. Tubby is located in Manville, R. I., with the Manville-Jenckes Corporation, yarn manufacturer. — Paul Johnson is still single, although no one has yet explained how the handsome brute has escaped so long. He's traveling for the industrial engineering division of the General Electric Company. — Henry Lamb studied civil engineering and is now located in Upper Darby, Pa., and is connected with Liberty Mutual Insurance Company. Claude Rice also studied civil engineering and he's in Peru, Vt., with the United States Forest Service and still single!

Carl Loeb has two children, a boy, age three, and a girl, age five. He is with the Climax Molybdenum Company doing some very interesting work on alloys. — Johnny Praetz of Course II fame is the new service manager for the Liquid Carbonic Company and still eligible for a good proposition providing it's blonde and beautiful. — Here's a surprise! Good old Howdy Root who has been closer to a gas engine than the pistons themselves is now at Harvard taking the premedical course, preparing to be a doctor. Next thing we know, we'll hear that Ralph Jope is studying to be a clergyman.

Rene Simard is in Montreal with the Imperial Oil Refinery doing special work in research chemistry. He completed some very advanced graduate studies in European universities following his graduation. — Milton Thompson is also in the single ranks after all these years and is now building up a private practice in orthopedic surgery. Hats off to you, Milton, and best wishes for your success. — In the next issue of The Review we will continue with more of the gang whose replies followed those mentioned above. Until then, cheerio! — GEORGE I. CHATFIELD, General Secretary, 5 Alben Street, Winchester, Mass.

1929

We are at last in receipt of a word from one of our classmates that your Secretary, at least, has not heard from or seen since we all left the Institute in 1929, or almost as long as that. Ralph Atkinson, IX-A, as you will judge from his comments in the following letter, has traveled across the country somewhat since following photographic pursuits: "This is a rather tardy response to the lovely Christmas card which you and Judy sent us. You may be surprised to see the drastic change in our location since last you heard from us, but that has been quite a while, thanks to my excellent behavior as a correspondent. Seems that three years ago this week I lost my job in Boston and landed one in Rochester with the research laboratory of the Eastman Kodak Company, and last summer they sent me out here to join the staff of their West Coast laboratory, motion-picture sales department. Here I act as a chemist and try to

aid in the servicing of our well-known product — film. It is a relatively small department, but the work is varied and interesting, as anything in Hollywood is bound to be. After a longer time here, I may be able to have more to say about some of the other phases of Hollywood life.

"Shirley and I find life here very pleasant (we should be ostracized if we didn't) and have a comfortable home in the city of Los Angeles. As you may have noticed in your papers, the previous insignificant dimensions of the largest city in the world have recently been extended to the borders of Oregon, Nevada, and Arizona, so that our location is a trifle vague. That is only the first step, however, toward the inevitable expansion of this great city in its conquest of civilization. Believe me, civilization had better watch out, because people who don't think a gas station on every corner is *ipso facto* an improvement over a gas station on every other corner are not civilized out here, and it's hard to combat such a virulent form of progress. (Progress: a word once used widely by idealists to denote an increase in spiritual and material welfare, now restricted solely to a unit of measure, frequently applied to population per city block.) You really wouldn't have picked me out of a lot of 50 promising young men as one to end up in Hollywood, would you?

"The photograph which you sent us of your new home inspired us with envy. We know that you must be very happy in it, and do not entirely regret the loss of your previous one. It is certainly attractive on the outside, and I know it must be likewise within. We wish you the best of luck with it, and Shirley joins me in sending our best regards to you two. I wish you would call up Fluque and Jimmy some day and wish them the same from us. I know one letter is all I will write to Akron for a while — I'm that lazy. I give you the company address, it is apt to be much more permanent than mine: 6706 Santa Monica Boulevard, Los Angeles, Calif."

We learn from our news clippings that the engagement of Putnam King, IV, and Una Cleveland Rogers of Concord, N. H., was announced late in February. — We are also informed through the same medium that our old swimming captain, Larry Luey, XV, is engaged to Natalie Birchall of Port Washington, N. Y. The announcement was made the latter part of January. Judging from Larry's business address, he is still working for Lee Higginson and Company in New York.

To Ralph, congratulations on his progress in the film industry and we hope he will write again and more frequently. To Putnam and Larry, our congratulations on signifying their intentions of joining the ranks of the benedicts and our best wishes for the future happiness we know they will enjoy. — EARL W. GLEN, General Secretary, Box 178, Fairlawn, Ohio.

1930

We are pleased to report the wedding on January 25 of Earl Bennett, I, and Miss Julia H. Williams of Jamaica Plain. They

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are now making their home in Augusta, Maine, where Earl is a highway engineer. — Miss Lydia J. Whittemore of Melrose became the bride of Al Bird, XIII, on February 15. Al is engaged as naval architect for the Navy Department in Washington. Russ Murley, IV, was present at the ceremony in the capacity of best man. — Johnny Scheuren, XV, was married on February 16 to Miss Kathryn G. Cudhea of Brighton, Mass. — The engagement of Miss Prudence Gager of Brooklyn to Ken Bucklin, VI, of Plainfield, N. J., was announced, February 15. Ken is working in the radiotron division of Radio Corporation of America. The Class joins me in extending heartiest congratulations and best wishes to all of the above members.

Hal Spaans recently wrote to say that Jack Vennard, I, is an instructor in the civil engineering department at New York University. Hal says that Jack and his wife will be very glad to see any of his classmates who happen to visit New York. They are living at 1950 Andrews Avenue, New York City. — Another civil engineer, Chuck Habley, is now located in Seattle, where he is working with Boeing Airplane Company. — Sanny Moss, X, is now with the Viscol Company in Marcus Hook, Pa., while from Chicago comes word that Harvey Chapman, VI, is employed by the Aeriect Air Conditioner Company. Further details concerning the last three boys are missing, and we look forward to learning more about them.

We are expecting a big turnout of classmates for the celebration of Alumni Day on June 8. Last year 16 of us took in the party and the interesting program being arranged for us this year should attract many from all courses. Those of us who are located in or around Boston can easily attend, talk over old and present times, and otherwise enjoy a perfect day. Monday, June 8, is the day! — PARKER H. STARRATT, *Secretary*, 75 Fenno Street, Wollaston, Mass.

1931

The first five-year reunion of the Class is to take place June 6 and 7. Every member of the Class and all of those who have been associated with the Class at any time will have received specific information concerning the reunion before these notes appear. Your attention is called to this event. Not only will it be only the first of what we trust will prove a memorable series of class gatherings, but it will serve to introduce the annual Alumni Day, an event of the greatest importance to Technology and to all of its Alumni.

It is proposed to publish for distribution on June 6 a booklet concerning the Class. We wish to make this complete in every detail. Information for inclusion in the booklet is being solicited. In returning the information requested of you, it will be appreciated if you will include any word concerning other members of 1931 who may be in out-of-the-way places, or whose addresses are unknown and who, therefore, have not been contacted.

There are a few announcements of weddings and engagements to be made: Mrs. Frank Porter Wade announces the marriage of her daughter, Effie Owings, to Albert Gardner Dean on March 7. — Mr. and Mrs. Archibald T. Robertson have announced the engagement of their daughter, Miss Ethel Catherine Robertson, to Frank R. Forrester. — The engagement of Miss Bernice Meyer, daughter of Mr. and Mrs. Philip E. Meyer, to Jack R. Weprin has been announced. — Mrs. John Joseph Dowling has announced the engagement of her daughter, Miss Barbara Anne Dowling, to Leonard Daniel Christie, Jr.

To Dr. and Mrs. Albert Louis Kaye a daughter was born, January 1. Tentatively named Louise, she is a pronounced Titian blonde. We extend our congratulations.

In closing I would suggest that inquiries concerning the reunion be addressed to G. M. Roddy, chairman of the reunion committee, 185 Franklin Street, Boston, or to your Secretary. — JAMES B. FISK, *General Secretary*, Room 6-108, M.I.T., Cambridge, Mass.

1932

COURSE X

I despair of ever seeing any notes on our Class again and as I know most of us take The Review so that we can keep track of our friends, I'll do my best to give you what I can on some of the boys and hope some of the information is wrong so the men in question will correct it. I have had one swell letter from Jim Abbott recently. He's still in the mill at Wilton, N. H., doing all sorts of engineering work, and skiing in his spare time. He says Freeman Fraim, Jr., was married a year ago and as far as I know he's still with the United Piece Dye Works, Inc., in Paterson, N. J. — Don Gilman was married two years ago to Doris Ekstrom. He is still with Sears, Roebuck and Company but God knows where. Tom Anderson is with Standard Oil Company of Louisiana at Baton Rouge. Earl Anderton is with the Scott Paper Company and lives at 210 Cornell Avenue, Swarthmore, Pa. [?] He is married. Lawrence Bailey is at Kingston, Mass., but I don't know what he's doing. Johnny Crowther is with Shell Petroleum Corporation at Woodriver, Ill. Kentro is in Warren, Ariz.

Billings is with DuPont Viscoloid at Arlington, N. J. — McCormack is in Virginia working on O'Sullivan's heels. Carter's Ink Company is getting the benefits of Dan Neilon's technical training. Bobby Parker is in Buffalo with National Aniline and Chemical Company and probably doing his competent bit in amateur theatricals. — Jack Kelton must have finished Harvard Law School. Buckley is with the Evans Case Company and Lee Burr is in Cambridge with the Burr Chromium Company. Brown is in Grasselli, N. J., with the Warner-Quinlan Company, as is Bill Walsh. Rolf Wallin is with the Union Carbide and Chemicals Corporation in Charleston, W. Va., and

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Bill Hall is married and in Philadelphia with the Atlantic Refining Company. Bob Semple is married and with Monsanto Chemical Company in St. Louis. Root is at the Danvers bleachery of the Pequot Mills.

Castleman is with the Bay State Chemical Company and Hansen is working at the K. J. Quinn and Company. Bill Holst is probably still in Palembang, Dutch East Indies, working for Standard Oil Company of N. J. Poor is in the paper business with W. C. Hamilton and Sons in Philadelphia. Potts Chambers is in with DuPont de Nemours and Company in Gibbstown, N. J., and Fahey is in Cambridge with Dewey and Almy Chemical Company. I don't know what Harry Green is doing, but his address is 22 Hillcrest Road, Caldwell, N. J. No news at all of George Connor. Dionne is in Lewiston, Maine. No news from Jana, but Bob Ingram is at Sixth and Harvey Streets, Oklahoma City, with Albert Ahrens Company. John Howe is at 29 Dover Street in Providence, R. I. What are you doing, Johnny?

Al Stockwell is a chemist at the Arnold Print Works at North Adams, Mass. Bill Kirkpatrick is on development work in the coated paper division of the S. D. Warren Company in Westbrook, Maine. He resigned his commission in the Coast Artillery, National Guard, last summer to accept a first lieutenantancy and command of the Active Marine Reserves in Portland. Dubb Rash is with the Lambert Pharmacal Company in St. Louis. Still breaking hearts, Dubb? Nick Rothen-thaler is at R.F.D. No. 3, Milford, Mich., with the Great Lakes Steel Corporation. No news of Pfeffer. Max Richmond is at 562½ Summer Street in Lynn and Herbert King is in Philadelphia with Attapulugus Clay Company. He has a baby and his home address is 115 East Lacrosse Street, Lansdowne, Pa. — George Connor is working for Croft Brewing Company. Mahoney is at 7 Herring Avenue, in Biddeford, Maine. Markstein is in Cincinnati working for the Full Measure Gas Company. Bill Schuler is in Syracuse, N. Y., with the Crouse-Hinds Company, and to finish it off, Bob Hubbell is in the technical division of the Attapulugus Clay Company.

I think that covers all of us; now let's have some more intimate information. We all like to read about the other fellow but some sort of false modesty holds too many of us back. As a matter of fact, if I can get enough information, I'll send you each a brief history of your classmates so you won't miss a chance contact. A year from this June is our Fifth you know! — WILLIAM A. KIRKPATRICK, *Secretary*, 85 Mechanic Street, Westbrook, Maine.

1933

As this issue reaches you another year has nearly rolled by since that illustrious June of 1933. Sometimes it seems quite a long time — at others it hardly seems possible that it is three years since we left Boston. Along these lines may we remind

1933 Continued

you of Alumni Day on June 8. We do not plan a formal reunion at this time, but should enough of you fellows out there care to express to Yours Truly your intentions of attending, we can arrange for some sort of informal reunion.

Just recently I have heard from Warren Henderson who asked for a list of names and addresses of Course II men so that he could contact them. We try to keep the records as up to date as possible down here and are only too glad to help you out in this way.

Here's part of a letter I received from Cal Mohr, who has recently been transferred from the DuPont Rayon Company at Buffalo to the R. and H. Chemicals Department of E. I. duPont de Nemours and Company at Niagara Falls: "Here I am in the drafting department and like the work very much. Just what will come in the future is hard to say, but the position has good possibilities. . . . Most of the work that I have done to date has been in connection with the electrolytic hydrogen-peroxide plant and the type of chemical work is a great change from the rayon industry.

"Frank Twomey, X, has been here about a year as an assistant engineer in the peroxide division and at the present time he is doing drafting work in this division. Robert Dunlavey, Jr., has been here since the first of the year doing drafting work in the electrical division.

"I attended the annual dinner-dance of the Rochester Alumni. At our table were Bob Smith, Dave Babcock, and Pete Meyer. We all had a most enjoyable time recalling the fun we had at school and it was more enjoyable for me as I had not seen Babcock or Meyer since we left school. Dick Morse and his wife were there also, so you see our Class was well represented.

"Tell the boys to drop in and see me when they come here on their honeymoon and Frank and I will show them the famous resort city of all wedding trips. — At a recent meeting of the Buffalo Alumni I met Edward E. Foster and A. M. Patterson of our Class. They are still at the Curtiss Airplane and Motor Company, Inc., Buffalo. — Regards to all." Glad to hear from you Cal, but are we allowed to drop in on you if we are not on wedding trips? — Well, that's all for this time. Hope to see many of you on alumni week-end. — GEORGE O. HENNING, JR., *General Secretary*, 163 Barbey Street, Brooklyn, N. Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-107, M.I.T., Cambridge, Mass.

1935

Another month has winged its way onward, and with its passing comes another Review with its notes of the wild Indians of '35. This time I am going to reverse the usual sequence and give you an account of myself first with a story of an unusual experience. I have been working these many months in the soils laboratory of the Passamaquoddy project. A short time after I arrived I started in to build a photoelasticity lab from the floor up. I mean that literally, as I did build

the room in which my equipment is contained, as well as most of the equipment. Several months were spent in this manner, and things finally rounded into shape for testing. The models have been built up of gelatin and lead shot to represent dams on clay, the gelatin representing the clay, and the shot the dams. The results have been mainly qualitative so far, dealing with the possible failure of dams and their settlements. The work from now on will have more of a quantitative nature, dealing with the amount and distribution of stresses under gravity dams. Needless to say the work has been very interesting and widely varied.

At times things look black for the project, and like all those with an eye to the possibilities of the future, I have been looking about the country for possible employment. Early in March I made a trip to Boston for an interview, an account of which follows: On a Wednesday morning I received a telegram requesting an interview the next day. Permission was obtained to make the trip, but during the course of the morning some of the high officials of the project witnessed the progress of one of my tests and requested another demonstration for the following day. The rest of the day was spent in rushing about preparing things for the next day and breaking in another man to do the testing in my absence. Immediately after supper that evening I started for Boston in my car. The trip was a memorable one: The roads were all torn up, and it had been raining torrents for a couple of days. However, except for crashing into and out of holes in the road, losing a windshield wing, and getting drenched by the water which leaked in through the roof, the trip was uneventful. I arrived at the home of my aunt and uncle in Wellesley at 4:30 in the morning, slept, still dressed, for two hours on a davenport, and then left for town. On the way down I had lost my hat, and, as it was still raining hard, I made several purchases in town before arriving for the interview.

Immediately after the interview I had lunch, packed my things, and left for Eastport, Maine, again. That was the beginning of the worst nightmare I have yet been through. Before I left the Boston suburbs I drove through water up to the running boards. The roads to Portland were in good shape except for several short sections where overpasses were being built, but the water was terrific. Several times on the way to Portland the running boards of the car were submerged. However, all went well until I hit Kittery, Maine. There, going around a curve in the dense fog and driving rain, traveling at 55 miles an hour, I hit a foot of water which just poured over, around, and into the car, and I nearly tried traveling in the ditch. I turned into a gas station which happened to be located on the curve, expecting to have to dry out the ignition, but the motor kept right on going, so I swung back into the road and went on. From Portland to Brunswick the road was in good shape and the water was not too bad, but a driver ahead

gave me the willies. As it is easier to follow a car than pick out the road for yourself when driving in a fog, I decided to trail him. Before we got to Brunswick my nerves were a wreck, for he had been traveling 50 and 55 miles an hour all the way and once hit 60, all of this through a fog you could cut with a knife. How he ever stayed on the road is something I cannot figure out.

Beyond Brunswick was a continuous battle. By that time most of the country had become flooded, with a consequent washing away of the roads. Although the travel was slow and the water often reached the floor boards, progress was steady until I struck Cherryfield, about 110 miles from Eastport. Here the river had overflowed its banks and had blocked the road with huge ice cakes and timbers. Even if the ice and log jam had not been in the way, I doubt if the car would have waded through the water, which was about three feet deep then. After having made a reconnaissance of the surrounding fields to find a detour, I turned back toward Ellsworth. Just before reaching this town I met a truck on its way north. I stopped the driver, explained the situation, and we had a conference to decide what to do. We finally continued toward Cherryfield, thinking that the truck might be able to break the jam loose. However, by the time we again reached that town, the road was submerged under about six feet of water with a terrific current tearing it away. The truck driver attempted to get through, but stalled, so I turned back once more. A farmer told me of an old dirt road which ran around Cherryfield, so, after having coffee and doughnuts, I turned down it. You can imagine what a dirt road would be like after the torrential rains: It was a mire, but the car managed to keep on plowing until I came to a place where the water had washed out a section about five feet wide and a foot and a half deep. At first I tried to crash through it, and succeeded in burying the front bumper in the mud. Subsequently I put on chains, dug out the bumper, and barely managed to back out of it. I decided to give up this tack and return to Ellsworth, but on the way I passed a pile of logs by the side of the road, which put the old construction mind into action. Loading the rear of the car with logs, I drove back to the hole in the road. Having built a corduroy road, I bounced over it and continued to wade through the mud. Shortly, I came to a wooden bridge which was much the worse for the water's having rushed over it during the night: The flooring was ripped up and the trusses were leaning toward the center. I gave a prayer and stepped on the gas. The bridge creaked and groaned, but held; I was again in the mire. Within a mile I came to another wooden bridge, this one in worse condition than the other — half of the truss on one side was leaning toward the center of the bridge and the other half was leaning toward the water. Again my heart rose to my mouth as I stepped on the gas, and again the bridge shuddered and groaned. Another half mile of mud, and I came to a

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third wooden bridge, which looked as bad as the other two put together. Not only were its trusses leaning all over the place, but the abutments had noticeably moved down stream. I thought I would die of heart failure before I got across, provided I did not die of dropping through the bridge in the meantime. My luck held, however, as did the bridge, and after a couple more miles of slime I reached Harrington, the next town beyond Cherryfield.

Here I breathed a sigh of relief, for I had passed the flooded area. The dangers were not over, for I soon came to a concrete bridge on the main highway over which the water was rushing. The raging torrent formed a wave higher than the railing where it struck against the side of the bridge. This bridge also had moved down stream, and the townsfolk had gathered to watch it fall. A number of cars were lined up on each side, and there were many people standing about; none dared to cross it. Having by this time become accustomed to taking chances, I once again stepped upon the gas, and was soon on the other side, leaving the hayseeds with their eyes staring in amazement and their mouths open in wonder. From then on it was merely a case of dodging chasms in the road and wading through flooded sections. I arrived in Eastport at 10:30 in the morning, after 19½ hours of driving and looking like the wreck of the *Hesperus*. I had some breakfast, changed my clothes, and went down to the lab to work for the rest of the day.

It has been quite a long time since we've heard from Wimpy Stockmayer. I guess he's been saving it up for a long time. At any rate, his letter is a good one, so here it is: "The new Review arrived this morning to remind me it was about time I wrote again. I wrote to Oscar a short while ago and once more asked for a definite statement on the insurance business. When and if I find out I'll let you know, for I think it ought to be in the column. I hope you're enjoying your work at Eastport and haven't been frozen to death. It's never that cold here, but the lack of central heating more than makes up for it. Imagine washing with water from an ice-covered pitcher every morning — that's what I'm doing. I have a feeling this letter will be more or less incoherent and rambling. My apologies, but here goes: First, to correct a printer's error, partly my fault, in my previous letter. I mentioned the existence of 800 Oxford undergraduettes, which is what they call co-eds here — sorry I slipped. It was printed 'undergraduates.' The total enrollment here is about 4,000, I think. All clear now?"

"Let me tell you about the very enjoyable three weeks I spent in Germany at Christmas time. I was in the province of Württemberg in southwestern Germany and spent most of my time in Stuttgart, the principal city, where I stayed with an aunt. That is the city where my father grew up, so it had plenty of added attraction for me. I was shown through the Institute of Technology (*Technische Hoch-*

schule) there. Although the buildings are old and rather crowded (having 2,000 students) they seem able to do a pretty good job of turning out engineers. The electrical and engine labs can't compare with M.I.T., of course, but seemed fairly good to my unskilled eye. They also have excellent metallography and electrochemistry departments there. The bulletin boards in the halls bristled with official notices reminiscent of those at the Institute. What impressed me was another large board devoted to notices from the National Socialist Party, and so on. Here, Julius Streicher's rabidly anti-Jewish paper, *Der Stürmer*, was posted. It is indeed true that politics and the state are being made a part of every walk of German life. Thanks to a cousin of mine (a civil engineer working on the new national highway), I got to know not a few of the good beer cellars, and also respectable places, in Stuttgart. One night I went to a German fraternity reunion, and 'the boys' somehow didn't seem so different from us, though many of them came in some sort of uniform. (Regular army duty is now compulsory again, you know.) However, they never degenerated into anything like our senior banquet, thank the Lord.

"In concluding my account of this phase of my social career, I wish to shed a tear of pity for the boys who still must gulp Croft Ale, or P.O.N., or what you will, in fair Boston, while I sample the various Hofbraus and Pilseners of the Vaterland. I spent several days in the town of Heidenheim, near the Bavarian border of Württemberg. It is a small manufacturing town of 22,000 population. There I met a German mechanical engineer who had spent some time in the Ural district of Russia in the lean year of 1932. His eye-witness accounts of the conditions sounded pretty bad, but in spite of his attempt to be fair, I'm afraid he had the universal German prejudice against Russia. Any notices in the German newspapers concerning Russia are all hostile — the Uruguay business happened while I was there and afforded the German editors . . . scathing comment.

"My train ride from Stuttgart to Heidenheim was very picturesque. The route followed the valley of the Rems, a branch of the Neckar, which is a tributary of the Rhine. I never saw so many grapevines; they were on all the hills, it seemed, except where there were pine forests. It was interesting to note the preponderance of evergreen trees in all the south German forests — they all have that inky blackness that has formed the background for so many stories. We passed several castles, among them the ruins of Hohenstaufen, ancestral hall of some of the Holy Roman Emperors (Frederick Barbarossa, and so on). We had a pretty good New Year's Eve in Stuttgart. I went dancing with a couple of cousins and some friends, and got completely tired out trying to waltz as fast as all the Germans — they spin like tops all evening and don't seem to feel it. The New Year was welcomed by a lot of bell ringing (shades of Oxford) . . .

"I left for Oxford rather sadly, on January 5, but not before I'd seen what I considered the funniest thing in Germany — a dog (an Irish terrier at that) giving the Nazi salute at the command of his master. What are my general impressions as a result of this visit? In the first place, Germany is quite as beautiful and romantic as I'd always imagined it. Furthermore, the country seems fairly prosperous (though I must admit that Württemberg probably has always suffered less than other parts of Germany). I tried to see the really poor sections of Stuttgart, but found no real evidence of poverty anywhere. It is true that Hitler has reduced unemployment to a low figure, but he has done it by reviving compulsory military service, speeding up rearmament, and hastening government projects — such as the highway system, the expense of which is falling on the government's already meager treasury. I really fear he is following exactly in Mussolini's footsteps, unless the mechanism of international exchange undergoes a revision. The people are for Hitler, there's no mistake about that. Those 'votes of confidence' were straight, and the one-sided propaganda is securing even more unity. Most of the people I met believe in Hitler's ability, and in his pacific intentions (I hope they're right), but I found very few who, when cornered in private, were 100% for the Nazi program. In Württemberg, where there are rather few Jews as compared to other parts of Germany, the people were quite liberal and the Jewish stores didn't seem to have lost any business. Streicher's *Stürmer* was peddled in all the cafés. Many people dislike it intensely. What an army those fellows have! Brown shirts, black shirts, and regulars — I guess about every fifth man on the street wears a uniform. All for defense and national honor, say Hitler and the German people; I hope so. One thing, however, seems foolish to me, and that is the French accusation that the new national highway system also has a military purpose. When you know that these highways run mostly on the crests of ridges and that they demand many bridges, you can see that such is not the case. Certainly there's nothing easier to destroy than a bridge. That's about all I can report as an eyewitness of Hitler's Germany. The nation is a proud and self-confident one again, and that is to Adolf's credit; but where he is leading them, nobody can predict.

"So back to England and Oxford. It's been pretty cold here, but hardly so bad as it must have been in the U.S.A. You fellows have one advantage, though — you keep the weather outside, while here a dinky fireplace in one corner is all we have to prevent our following in the footsteps of the proverbial brass monkey. So far this term has been a good one, except scholastically, for me. I've done too little work but had lots of fun otherwise. Starting next Thursday, there's a week of bumping races on the river, and I'm still lucky enough to be sitting in the Jesus first boat, which for these races is restricted to first- and second-year men,

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and others who haven't previously made their college's first eight. We've been in training two weeks already — which means bed by 10:30 and eating at training table (good), but also getting up at seven to do some jogging (very bad). I'm also playing water polo on the college team. We're at present still leading the league but will probably be beaten out by St. John's, who have Knapp, ex-Stanford and a member of the 1932 United States Olympic team. We're getting along fairly well with the English, Welsh, and Irish lads — of the three I think I like the English least. About once a week some of us Americans get together for tea (which we never call anything but 'bilge') and gripe about Oxford and the English, in a good-natured sort of way. The real fact is that most of us, though enjoying life in general, are a bit disappointed in the highly touted Oxford tutorial system, which seems a lot less efficient than our American set-up. Most of us are getting less done than we expected. That fact plus the cold and the dirt and an occasional over-dose of English smugness generates plenty of steam to blow off every now and then. Don't misunderstand me — this isn't a personal gripe, and there are many worth-while things here. We're not deprecating Rhodes scholarships or their value, nor do we hate all Englishmen — we just are tired of hearing them think how much better than anyone else they are. I guess nothing can be done about it — they've always been that way and always will be. Besides, there are some exceptions who make up for their countrymen's faults. As I said before, I've not been working nearly so hard as I should. Somehow the Oxford life isn't designed for working, and it takes real will power to make yourself accomplish anything. This laziness, plus several unexpected mishaps and delays, have put me far behind my schedule on the research. Well, I still have one-and-a-half years to go, and there's still hope. As evidence of my sincerity in this line, I submit the fact that I'm staying in Oxford for Easter vacation, while most of the boys go off to Munich.

"Keep that column going — I wish you could wangle a letter out of the Beaver Orator (What Duff), the Handsomest Man (Bloomers), or the Biggest Politician (Fishface). p.s. — English food hasn't improved since last I wrote; and I haven't had a single Hamburger since I left New York. Man, I'm starving — as shown by the fact that I've gained 12 pounds since I started rowing — I hit the scales at 181 now."

It looks as if this report were going to turn into a series of quotations similar to the last one. Time seems to be at a premium, so you'll just have to stand for it. This fellow Paul Cohen seems to be doing unusual things regularly. Get a load of this letter he sent in: "There was once a Course II graduate who became an undertaker; and there was another who wound up as a minister. So it should occasion you no surprise to learn that I am at present an instructor in the Department of English and History at the Institute.

The opening, which occurred in January, found me available because up to that time the industrial world had been indifferent to my imposing array of virtues." — Here is another quotation, this time from Les FitzGibbon: "As you have already noted in *The Review*, I was married to Sarah Miller Bick. Our wedding trip included Maine, Key West, and Havana. After returning from this pleasant trip we settled in dear old Sea Cliff and I went to work in my father's business. In the space of a month or two my wife and I expect to have a home in one of the suburbs of New York City. Starting to learn the business is quite an experience after plugging away at textbooks for four years. I have been doing a lot of lathe and milling machine work here at the plant. (Was I glad I took machine tool lab!) Right now we are perfecting a machine for the production of special composition plunger rings. At this point I regret very much not having taken more chemistry. Incidentally, if any of the boys are connected with steamship lines, railroads, and so on, I suggest they drop me a line and I will write concerning the complete packing service we have to offer."

Darrell Root has been skipping around from one job to another: He worked for the Massachusetts department of public health from June 10 to December 1; he took part in the Boston harbor investigation, collecting routine samples, inspecting private water supplies, and investigating the condition of overnight camps; since December 1 he has been working part time for the Electrical Engineering Research Department at M.I.T.; he has been assisting in the operation of the differential analyzer, and finds it interesting work; in the meantime he has been trying to find another job.

It seems that I made a mistake last time in reporting Bill Howell: Bill is with the radio transmitter test department of General Electric in Schenectady. He recently attended a meeting of the Schenectady Technology Association at which Professor Reynolds '25 delivered a very interesting talk on the Cape Cod Canal model. Bill also reports that Stan Howard has returned to school, and that Bill Keefe has been transferred to the Pittsfield works for several months.

Paul Panagiotakos has been in the research department of the Atlantic Refining Company in Philadelphia since last June. He finds the work very interesting, and the atmosphere is quite cosmopolitan and educational, from the scientific, political, and even philosophical points of view. One thing he likes about his job is the freedom from routine. Much of the details and mapping out of a specific problem is left to the individual. — George Morrisett is with the Federal Shipbuilding and Drydock Company, in Kearny, N. J. He is in the estimating department, and has spent most of his time there working on estimates of change of cost and weight incurred by the alterations made on the destroyers that are being built there. Once a week he goes over to the Officer's Reserve Corps school in

New York. He meets two other M.I.T. graduates of our Class there, but most of the group is composed of alumni of New York University and other New York schools.

Our next bit of news comes from Henry Kimball. Here is his letter verbatim: "... You know, of course, that Jack Hossfeld and I are working for the United Shoe Machinery Corporation. We are in the experimental department, in Beverly, where we are supposed to be learning all about shoe machinery (and believe me that's plenty). In other words, they have mapped out a year's schedule which varies from traveling on the road visiting shoe factories, to pushing a pencil on the drawing board. Talk about variety being the spice of life! By the time July 1 comes rolling around, they expect that they and we will have an idea what we should like best to do. The work is all very interesting, and there are a lot of Technology graduates here. I have been spending my week-ends in the same manner as about half of New England — on skis in New Hampshire. It sure is a great sport — if you do not wrap yourself around a tree. Someone told me that Arthur Hamilton is working and living in Lynn. Do you know if this is true? If you ever get in touch with him, tell him to look me up — I'm only a few miles away, but I don't know his address. I'll take this opportunity to tell you that you are doing a great thing in *The Review*, Bob. We voters picked a good live wire for permanent secretary. Keep up the good work, and I'll try to keep you posted if anything exciting happens down in this neck of the woods."

News flash from Jim Casale! Stan Lane is the first Course III man to trip down the center aisle with a fair young damsel, the first to take the sacred vows of matrimony — the lucky gal, Miss Bertha Kampfachs, Aroyo, Mont. Now another quote; Jack Orchard is the author of this one: "Literally following on the heels of graduation as you probably know, I withdrew from my celibate existence and plunged into the marital state, in which, fortunately, I have remained. Having long since decided on at least an attempt at a legal career, last summer was spent, not as a side-show barker, but in a law office in New York opposite the willy wilds of the stock exchange. In furtherance of my legal education I entered the Harvard Law School, where to my dismay, I found myself the only 1935 Tech man. This is probably just as well, for if there were a law school attached to the Institute, it would go for a worse ride than either Course XV or Architecture, for the simple reason that it necessitates the shoveling out of loads and loads of bull from one end of the year to the other without any respite in the form of a physics or chemistry course, where at least there are some set formulas to rely on in case of emergency. Fortunately or unfortunately, most scientifically trained minds couldn't stand all that guff, but my association with Course XV — Loomis, Duff, Ballard, Keeling, et alii — has trained me to be tolerant of anything.

Plan to attend Alumni Day at M.I.T. on June 8, 1936

1935 Continued

"Have seen around the village, Jack Burton and Trow Leavitt who are over at the business school, Jack having been there since September and Trow having just arrived about a month ago to undertake the January to August course which they give. I understand that he spent the interim between June and January finishing his thesis and loafing. I went down to New York over Washington's Birthday — you know, the freedom of the lawyer — and spent one evening in Greenwich Village where three of last year's Course XV men and one XIV man have sublet an apartment while they merrily peruse their work in the big city. The three are Dick Hughes, Bob Forster, and Tom Keeling, while the one is Moose Kennedy. Speaking of Keeling reminds me that you could get some interesting dope, even though a bit late, if you ask him to write you an account of his and Loomis' activities while at Reserve Officers' Training Camp last summer in Virginia. From all I gather they had one roaring good time, running around with the colonel's daughter, and all that. That's about all, Bob — too much of the ordinary I'm afraid, but if it will help out at all then that's something. I also enclose for what it is worth, part of the alumni notes of the fraternity's bulletin, and if you can use any dope off that, go ahead." From this source we learn: Buckley Crist is employed at the Calco Chemical Company at Bound Brook, N. J.; Bill Kiebler is continuing his career in architecture at Enid, Okla.; Dick Hughes is working for Dun and Bradstreet, in New York City; Don Morrison is doing engineering for the York Ice Machine Corporation at York, Pa.; Bob Forster is doing estimating work for York Ice, in New York City; Ed Clark is still at Tech doing graduate work in mining engineering; Bob Kennedy is working as technical adviser to the Union Carbide and Carbon Corporation in New York City.

Gerry Rich looked all summer for a job, following graduation and finally landed one with the Hygrade-Sylvania Corporation at Salem, Mass., and lives at 31 Concord Street, Malden. Gerry likes his work very much, although he has not yet had much opportunity to use originality. The company is putting up a new plant and he hopes to benefit by the expansion. Gerry also has joined the ranks of the happily married. The ceremony took place in Portsmouth, N. H., January 4, Verna Mackay being the better half. Congrats Gerry and best wishes for many years of happiness! Gerry Rich reports that Ken Young is with Hygrade-Sylvania also.

The next bit of news is from Dick Bailey; here's his letter: "Arrival at the stage where I can afford to belong to the Alumni Association and peruse The Review has made me aware of the piker I am in not writing to you. Even if for no other reason than that one of my worthy classmates may conceitedly point to another of his compatriots who has a job. But it does not put me into a glowing and sentimental mood to read about all my errant classmates struggling for existence

on this good earth. I can vividly picture the great Duff, Ballard, Bemis, Grant, Loomises, and the other cutthroats lying awake nights worrying about that income tax. Duff and Ballard will do their evasions with ease, as well as the rest of Course XV, but I grieve for the vulnerable engineers. Perhaps they will now appreciate the value of our Course. Well, we told you so! Now to dispense with myself and my career: Kodak claimed me upon graduation. I spent three months in Rochester, in the training course, casting my feelers around for the job I liked. Not only did I get a job but one beyond my wildest expectations. The net result is that I am living in sunny Tennessee, working for the Tennessee Eastman Corporation in the standard cost department. The company is a young, aggressive, and pleasant organization to work for, in the chemical industry, the industry of boundless possibilities, thank you. I am on my own most of the time, and I have called into play practically everything we touched on in school, which is covering a lot of ground. So soon am I realizing the tremendous value of the Institute and daily I am growing more attached to it. Although there are some of our ilk hereabouts, mostly 31's and 32's, I have found none of the 1935 classics, and I am sorry to say that I have nothing to report on them. It looks as though the Institute is going in for a little New Dealing with its dinghies. Now why couldn't we have inaugurated this latest pastime? As I see it, the floating classroom is one step nearer realization. Tan and tangents all at one whack. That's progress!" After all Dick, we had to leave something for the next class to invent.

Bill Leary quit the Standard Oil Tanker, *Cerro Ebano*, to take a job as stand-by mate on the *Leviathan*, which, in turn, he gave up for the third mate's job on the *Ceiba*, of the United Fruit Company. Bill was en route from Frontiera, Mexico, to Philadelphia when he wrote to me. — Joe Cook has left the ranks of the unemployed and is now working for the Barium Reduction Works in South Charlestown, W. Va., as an electrical engineer. He says that, although it is a chemical plant there is plenty of electrical engineering to be done. His job is a mixture of electrical and mechanical engineering, with plenty of practical work. He reports that Frank Walters is now working for the Potomac Electric Power Company in Washington, D. C. — Bill Thompson has been doing research at M.I.T. on clay, and working toward a doctor's degree in chemical engineering. That, along with skiing has kept his mind occupied most of the winter, with the emphasis on the skiing.

At last Course XVII crashed through with a bit of news. Vin Cook wrote the following: "One morning a neighbor of mine, who is a member of the firm of Metcalf and Eddy, called up and asked if I wanted a job. I started work that morning inspecting borings for the Oak Hill sewer in Newton — about 3 miles. That lasted for about a month and then I did nothing until just before Christmas when

they thought that the contract would be let and so I started in again. I worked in the office until the end of January, when they formed a field party of three of us. The whole of January went by before the PWA approval finally came — then bad winter weather set in and so up until within the last couple of weeks practically nothing had happened. It is really just now that they are getting under way. The sewer is about 8,500 feet long and the first 2,000 feet of it are in tunnel. It looks as though some of this tunnel would have to be done under air pressure. There is another piece of news that might interest you, and that is that Doris Jones and I announced our engagement at a New Year's Eve party just before 1935 went out." I also had a letter from Larry Hall, who is still down on the Cape Cod Canal. He and Bob Greer have moved across the river to a private home in the residential section of town.

Charlie Smith is still doing graduate work and assisting Professor Adams '21. Dick Smith continues with Boston Canadian Insurance. Freddy O'Brien is attending Tuft's Medical. The marriage fatalities continue at a high rate. Jack Loomis and Miss Anita Flanders plan to take the big step soon.

Here is a bit of news about those who received advanced degrees with us. Carl Floe, teaching in the state college at Pullman, Wash., had his troubles, for Mrs. Floe — who was Peggy Proctor — was quite ill during the early part of the winter. Her health has improved very much with the coming of spring, and they are enjoying some unusually fine warm weather. Alec Leal is in Rio de Janeiro with a public utilities company, as junior engineer on the staff of the chief electrical engineer. He has been gathering data for some contemplated stability studies. — Preston Conner is in Port Arthur, Texas, with the Gulf Refining Company and has received several promotions. The paper which he and Bob Ganoung wrote on their thesis was published in the September issue of the *Journal* of the Optical Society of America. Incidentally, most of this information is taken from a letter from Bob Ganoung, but he omitted to say what he is doing.

Now, some general information of interest to all of you: First, let me remind those who were graduate students with us that this is just as much their column as it is that of the fellows who received their bachelor's in the Class of 1935; second, let me again call to your attention the fact that Dick Lawrence is now the Assistant Secretary of our Class, write to him occasionally. This year there will be no planned get-together, but all present will meet in the west lounge of Walker at nine A.M. on Alumni Day, Monday, June 8. If the group meeting there is in favor of further activity as a group, plans will be formulated at that time. I hope to see many of you there. — ROBERT J. GRANBERG, *General Secretary*, 9 Old Town Road, Wellesley Farms, Mass. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.



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